Supplement to
Estimating the spectral density at frequencies near zero

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May 17, 2022

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[‡]Research partially supported by NSF grant DMS 19-14556.

Appendix A The Polynomial Gaussian Process

Here we discuss the construction of the nonlinear process defined in Terdik and Meaux (1991), and present new results on its spectral density. Let $\Psi(z) = \sum_{j \in \mathbb{Z}} \psi_j z^j$ and $\Psi(z,y) = \sum_{j,k \in \mathbb{Z}} \psi_{j,k} z^j y^k$, and let $\{\epsilon_t\}$ be a stationary time series of inputs, with mean zero and polyspectra $g_2(z)$, $g_3(z,y)$, and $g_4(z,y,x)$. Let the corresponding autocumulants be denoted γ_{h_1}, γ_{h_1,h_2}, and γ_{h_1,h_2,h_3}, where

$$g_2(z) = \sum_{h_1 \in \mathbb{Z}} \gamma_{h_1} z^{h_1}, \quad g_3(z,y) = \sum_{h_1,h_2 \in \mathbb{Z}} \gamma_{h_1,h_2} z^{h_1} y^{h_2}, \quad g_4(z,y,x) = \sum_{h_1,h_2,h_3 \in \mathbb{Z}} \gamma_{h_1,h_2,h_3} z^{h_1} y^{h_2} x^{h_3}.$$

Then define the stationary process $\{X_t\}$ via

$$X_t = \sum_{j \in \mathbb{Z}} \psi_j \, \epsilon_{t-j} + \sum_{j,k \in \mathbb{Z}} \psi_{j,k} \, (\epsilon_{t-j}\epsilon_{t-k} - \gamma_{k-j}). \tag{A.1}$$

This is an example of a polynomial process, and when the inputs are Gaussian it is called a Hermite process of order 2. Let the polyspectra be denoted $f_2(z)$, $f_3(z,y)$, and $f_4(z,y,x)$. Although Terdik and Meaux (1991) derive $f_2(z)$, the presentation of the result leaves the effect of $\Psi(z)$ and $\Psi(z,y)$ somewhat opaque; below, we generalize their result, as they considered the special case of ϵ_t being i.i.d. Gaussian. We use the shorthand $\langle g(z) \rangle_z$ for $(2\pi)^{-1} \int_{-\pi}^{\pi} g(e^{-i\lambda} d\lambda$.

Proposition A.1 *The polynomial process defined via (A.1) has spectral density*

$$\begin{aligned} f_2(z) &= \Psi(z)\Psi(z^{-1})\, g_2(z) + \Psi(z) \,\langle \Psi(z^{-1}y, y^{-1}) g_3(z^{-1}y, y^{-1}) \rangle_y + \Psi(z^{-1}) \,\langle \Psi(zy^{-1}, y) g_3(zy^{-1}, y) \rangle_y \\ &\quad + g_2(z) \langle \big(\Psi(zy^{-1}, y) + \Psi(y, zy^{-1}) \big) \, \Psi(z^{-1}y, y^{-1}) g_2(y) \rangle_y \\ &\quad + \langle \langle \Psi(y^{-1}z, y) \Psi(z^{-1}z, z^{-1}) g_4(y, z^{-1}x, x^{-1}) \rangle_y \rangle_x. \end{aligned}$$

Remark A.1 In the case of i.i.d. Gaussian inputs with variance σ^2, and with $\Psi(z,y) = \Upsilon(zy)$ for some power series $\Upsilon(x)$, the spectral density in Proposition A.1 simplifies to

$$f_2(z) = \Psi(z)\Psi(z^{-1})\, \sigma^2 + 2\, \Upsilon(z)\Upsilon(z^{-1})\, \sigma^4.$$

Proof of Proposition A.1. We use the spectral representation: with $\mathcal{Z}(z)$ denoting the orthogonal increments process corresponding to $\{\epsilon_t\}$, we have

$$\begin{aligned} X_t^{(1)} &= \sum_{j \in \mathbb{Z}} \psi_j \, \epsilon_{t-j} = \int z^{-t} \Psi(z) \, d\mathcal{Z}(z) \\ X_t^{(2)} &= \sum_{j,k \in \mathbb{Z}} \psi_{j,k} \epsilon_{t-j} \epsilon_{t-k} = \int \int (zy)^{-t} \Psi(z,y) \, d\mathcal{Z}(z) d\mathcal{Z}(y), \end{aligned}$$

and $X_t = X_t^{(1)} + X_t^{(2)} - E X_t^{(2)}$. Next,

$$\mathrm{Cov}[X_t, X_{t-h}] = \mathrm{Cum}[X_t^{(1)}, X_{t-h}^{(1)}] + \mathrm{Cum}[X_t^{(1)}, X_{t-h}^{(2)}] + \mathrm{Cum}[X_t^{(2)} X_{t-h}^{(1)}] + \mathrm{Cum}[X_t^{(2)} X_{t-h}^{(2)}].$$

Each of these four terms can be computed using Theorem 4.6.1 of Brillinger (1982). Letting Δ denote the Dirac functional,

$$
\begin{aligned}
\mathrm{Cum}[X_t^{(1)}, X_{t-h}^{(1)}] &= \int\int z_1^{-t} z_2^{h-t} \Psi(z_1)\Psi(z_2) \mathrm{Cum}[d\mathcal{Z}(z_1), d\mathcal{Z}(z_2)] \\
&= \int\int z_1^{-t} z_2^{h-t} \Psi(z_1)\Psi(z_2)\Delta(z_1 z_2) g_2(z_1) dz_1/(2\pi) \\
&= \langle z_1^{-h} \Psi(z_1)\Psi(z_1^{-1}) g_2(z_1)\rangle_{z_1} \\
\mathrm{Cum}[X_t^{(1)}, X_{t-h}^{(2)}] &= \int\int\int z_1^{-t} (z_2 y_2)^{h-t} \Psi(z_1)\Psi(z_2, y_2) \mathrm{Cum}[d\mathcal{Z}(z_1), d\mathcal{Z}(z_2) d\mathcal{Z}(y_2)] \\
&= \int\int\int z_1^{-t} (z_2 y_2)^{h-t} \Psi(z_1)\Psi(z_2, y_2)\Delta(z_1 z_2 y_2) g_3(z_2, y_2) dz_2 dy_2/(2\pi)^2 \\
&= \langle\langle (z_2 y_2)^{-h} \Psi(z_2 y_2)\Psi(z_2^{-1}, y_2^{-1}) g_3(z_2^{-1}, y_2^{-1})\rangle_{z_2}\rangle_{y_2} \\
\mathrm{Cum}[X_t^{(2)}, X_{t-h}^{(1)}] &= \int\int\int (z_1 y_1)^{-t} z_2^{h-t} \Psi(z_1, y_1)\Psi(z_2) \mathrm{Cum}[d\mathcal{Z}(z_1) d\mathcal{Z}(y_1), d\mathcal{Z}(z_2)] \\
&= \int\int\int (z_1 y_1)^{-t} z_2^{h-t} \Psi(z_1, y_1)\Psi(z_2)\Delta(z_1 y_1 z_2) g_3(z_1, y_1) dz_1 dy_1/(2\pi)^2 \\
&= \langle\langle (z_1 y_1)^{-h} \Psi(z_1, y_1)\Psi(z_1^{-1} y_1^{-1}) g_3(z_1, y_1)\rangle_{z_1}\rangle_{y_1} \\
\mathrm{Cum}[X_t^{(2)}, X_{t-h}^{(2)}] &= \int\int\int (z_1 y_1)^{-t} (z_2 y_2)^{h-t} \Psi(z_1, y_1)\Psi(z_2, y_2) \mathrm{Cum}[d\mathcal{Z}(z_1) d\mathcal{Z}(y_1), d\mathcal{Z}(z_2) d\mathcal{Z}(y_2)].
\end{aligned}
$$

Considering the indecomposable partitions of a 2×2 table, we find that

$$
\begin{aligned}
\mathrm{Cum}[d\mathcal{Z}(z_1) d\mathcal{Z}(y_1), d\mathcal{Z}(z_2) d\mathcal{Z}(y_2)] &= \Delta(z_1 z_2)\Delta(y_1 y_2) g_2(z_2) g_2(y_2)/(2\pi)^2 \\
&+ \Delta(z_1 y_2)\Delta(y_1 z_2) g_2(y_2) g_2(z_2)/(2\pi)^2 \\
&+ \Delta(z_1 y_1 z_2 y_2) g_4(y_1, z_2, y_2)/(2\pi)^3.
\end{aligned}
$$

Thus,

$$
\begin{aligned}
\mathrm{Cum}[X_t^{(2)}, X_{t-h}^{(2)}] &= \langle\langle (z_2 y_2)^{-h} \left(\Psi(z_2, y_2) + \Psi(y_2, z_2)\right) \Psi(z_2^{-1}, y_2^{-1}) g_2(z_2) g_2(y_2)\rangle_{z_2}\rangle_{y_2} \\
&+ \langle\langle (z_2 y_2)^{-h} \langle \Psi(y_1^{-1} z_2 y_2, y_1)\Psi(z_2^{-1}, y_2^{-1}) g_4(y_1, z_2^{-1}, y_2^{-1})\rangle_{y_1}\rangle_{z_2}\rangle_{y_2}.
\end{aligned}
$$

Gathering terms, and making a change of variable yields

$$
\begin{aligned}
\mathrm{Cov}[X_t, X_{t-h}] &= \langle z_1^{-h} \Psi(z_1)\Psi(z_1^{-1}) g_2(z_1)\rangle_{z_1} \\
&+ \langle z_2{}^{-h} \langle \Psi(z_2)\Psi(z_2^{-1} y_2, y_2^{-1}) g_3(z_2^{-1} y_2, y_2^{-1})\rangle_{y_2}\rangle_{z_2} \\
&+ \langle z_1{}^{-h} \langle \Psi(z_1 y_1^{-1}, y_1)\Psi(z_1^{-1}) g_3(z_1 y_1^{-1}, y_1)\rangle_{y_1}\rangle_{z_1} \\
&+ \langle z_2{}^{-h} \langle \left(\Psi(z_2 y_2^{-1}, y_2) + \Psi(y_2, z_2 y_2^{-1})\right) \Psi(z_2^{-1} y_2, y_2^{-1}) g_2(z_2) g_2(y_2)\rangle_{y_2}\rangle_{z_2} \\
&+ \langle z_2{}^{-h} \langle\langle \Psi(y_1^{-1} z_2, y_1)\Psi(z_2^{-1} y_2, y_2^{-1}) g_4(y_1, z_2^{-1} y_2, y_2^{-1})\rangle_{y_1}\rangle_{y_2}\rangle_{z_2}.
\end{aligned}
$$

Now summing against z^h, the final result is obtained. q.e.d.

We construct a simulation using the setting of Remark A.1, taking $\Psi(z) = (1-\phi_1 z)^{-1}$ and $\Upsilon(z) = (1-\phi_2 z)^{-1}$. This generates a spectral density

$$f_2(z) = \frac{\sigma^2}{(1-\phi_1 z)(1-\phi_1 z^{-1})} + \frac{2\sigma^4}{(1-\phi_2 z)(1-\phi_2 z^{-1})}.$$

The coefficients of the polynomial Gaussian process are

$$\psi_j = \phi_1^j \, 1_{\{j \geq 0\}}, \quad \psi_{j,k} = \phi_2^j \, 1_{\{j=k, j \geq 0\}}.$$

Hence, it is straightforward to construct a simulation of this process, and the spectral density will resemble that of the sum of two independent AR(1) processes.

Appendix B Supplementary Tables and Figures

B.1 Gaussian Process

Results are based on simulations of 25 Gaussian ARMA processes described in the main paper. For the tables, the Local quadratic estimator $\widetilde{f}(\theta)$ is computed via OLS using the data-based optimal bandwidth $\widehat{\delta}_*$, which is determined by using the Flat-top tapered spectral estimator. For the figures, a range of fixed δ values are used, letting this quantity range from .005 to .250 in 50 increments.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.173	0.326	0.369	0.038	0.048	0.061	0.009	0.013	0.016
Flat-top taper	0.103	0.596	0.605	0.063	0.190	0.200	0.021	0.071	0.074
Local ($\widehat{\delta}_*$)	0.102	0.312	0.328	0.012	0.094	0.094	-0.003	0.035	0.035

Table B.1: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-126.897	219.219	253.298	-46.075	237.282	241.714	-27.932	144.416	147.092
Flat-top taper	-60.912	318.191	323.969	21.666	331.520	332.227	14.033	176.189	176.747
Local ($\widehat{\delta}_*$)	-160.586	181.526	242.362	-75.435	198.617	212.460	-35.548	131.383	136.107

Table B.2: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.067	0.230	0.239	-0.005	0.066	0.066	-0.006	0.040	0.041
Flat-top taper	0.016	0.382	0.383	0.019	0.132	0.133	0.004	0.059	0.059
Local ($\widehat{\delta}_*$)	0.048	0.219	0.224	0.001	0.075	0.075	-0.008	0.036	0.037

Table B.3: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-75.823	136.892	156.488	-31.727	135.955	139.608	-14.727	96.877	97.990
Flat-top taper	-35.421	199.037	202.164	7.170	188.187	188.323	10.930	120.639	121.133
Local ($\widehat{\delta}_*$)	-95.925	113.872	148.891	-48.599	114.144	124.059	-20.040	85.844	88.152

Table B.4: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.056	0.230	0.237	-0.051	0.154	0.162	-0.022	0.098	0.100
Flat-top taper	-0.094	0.281	0.296	-0.043	0.166	0.171	-0.018	0.106	0.108
Local ($\widehat{\delta}_*$)	-0.014	0.206	0.206	-0.034	0.108	0.114	-0.028	0.072	0.078

Table B.5: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-39.882	68.918	79.625	-14.695	70.351	71.869	-8.515	45.978	46.760
Flat-top taper	-19.952	100.171	102.139	5.509	97.685	97.840	4.123	56.955	57.104
Local ($\widehat{\delta}_*$)	-49.833	57.371	75.992	-23.619	58.651	63.228	-11.210	41.929	43.402

Table B.6: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.159	0.316	0.353	-0.113	0.256	0.280	-0.047	0.176	0.182
Flat-top taper	-0.214	0.372	0.430	-0.109	0.285	0.306	-0.041	0.189	0.193
Local ($\widehat{\delta}_*$)	-0.086	0.276	0.289	-0.073	0.181	0.195	-0.046	0.117	0.126

Table B.7: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-14.812	25.002	29.060	-5.791	25.181	25.838	-3.444	15.484	15.863
Flat-top taper	-8.386	35.917	36.883	0.644	34.284	34.290	0.595	18.705	18.714
Local ($\widehat{\delta}_*$)	-18.102	20.889	27.642	-9.022	20.922	22.785	-4.509	14.224	14.921

Table B.8: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.050	0.307	0.311	0.042	0.226	0.230	-0.012	0.159	0.159
Flat-top taper	0.038	0.344	0.346	0.031	0.259	0.261	-0.020	0.181	0.182
Local ($\widehat{\delta}_*$)	-0.143	0.329	0.358	-0.097	0.185	0.209	-0.029	0.121	0.124

Table B.9: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.552	1.787	3.115	-2.236	1.627	2.765	-1.415	1.255	1.891
Flat-top taper	-2.460	2.308	3.373	-2.202	1.833	2.865	-1.502	1.287	1.978
Local ($\widehat{\delta}_*$)	-2.399	1.628	2.899	-2.243	1.429	2.659	-1.630	1.119	1.977

Table B.10: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.087	0.177	0.198	0.048	0.136	0.144	0.010	0.030	0.031
Flat-top taper	-0.444	0.731	0.856	0.056	0.256	0.262	-0.016	0.094	0.095
Local ($\widehat{\delta}_*$)	0.033	0.132	0.136	0.003	0.050	0.050	-0.008	0.036	0.037

Table B.11: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.570	7.624	8.045	-1.481	4.329	4.575	-0.835	2.458	2.596
Flat-top taper	-1.337	9.702	9.794	-0.690	4.941	4.989	-0.299	2.616	2.633
Local ($\widehat{\delta}_*$)	-3.457	6.688	7.529	-1.873	4.071	4.481	-0.939	2.334	2.516

Table B.12: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.016	0.139	0.140	0.034	0.138	0.142	0.012	0.060	0.061
Flat-top taper	-0.347	0.461	0.577	0.016	0.192	0.192	-0.010	0.070	0.071
Local ($\widehat{\delta}_*$)	0.017	0.147	0.148	0.000	0.068	0.068	-0.007	0.038	0.039

Table B.13: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.702	4.477	4.790	-0.911	2.558	2.715	-0.510	1.426	1.514
Flat-top taper	-1.038	5.661	5.756	-0.473	2.916	2.954	-0.210	1.507	1.522
Local ($\widehat{\delta}_*$)	-2.200	3.983	4.550	-1.181	2.372	2.650	-0.585	1.344	1.466

Table B.14: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.005	0.336	0.336	0.002	0.158	0.158	0.023	0.100	0.102
Flat-top taper	-0.194	0.444	0.484	-0.087	0.210	0.227	0.006	0.081	0.081
Local ($\widehat{\delta}_*$)	-0.001	0.284	0.284	-0.006	0.133	0.134	-0.015	0.061	0.063

Table B.15: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.090	2.046	2.318	-0.584	1.188	1.324	-0.313	0.672	0.741
Flat-top taper	-0.851	2.491	2.633	-0.472	1.336	1.416	-0.223	0.703	0.738
Local ($\widehat{\delta}_*$)	-1.243	1.776	2.168	-0.772	1.117	1.358	-0.380	0.635	0.740

Table B.16: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.091	0.250	0.266	0.105	0.147	0.181	0.058	0.112	0.126
Flat-top taper	0.083	0.272	0.285	0.096	0.170	0.195	0.035	0.145	0.149
Local ($\widehat{\delta}_*$)	-0.042	0.293	0.296	-0.040	0.144	0.149	-0.029	0.071	0.076

Table B.17: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.388	0.401	0.558	-0.373	0.229	0.438	-0.291	0.198	0.352
Flat-top taper	-0.378	0.459	0.595	-0.370	0.239	0.441	-0.300	0.190	0.355
Local ($\widehat{\delta}_*$)	-0.246	0.451	0.514	-0.261	0.214	0.337	-0.249	0.133	0.282

Table B.18: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.328	0.387	0.507	-0.137	0.318	0.346	-0.024	0.166	0.168
Flat-top taper	-0.324	0.432	0.539	-0.065	0.387	0.393	0.047	0.213	0.218
Local ($\widehat{\delta}_*$)	0.056	0.471	0.474	0.059	0.273	0.279	0.002	0.156	0.156

Table B.19: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.819	0.354	0.892	0.526	0.371	0.644	0.156	0.103	0.187
Flat-top taper	0.805	0.385	0.892	0.582	0.338	0.673	0.316	0.172	0.360
Local ($\widehat{\delta}_*$)	0.549	0.300	0.626	0.445	0.256	0.513	0.229	0.173	0.287

Table B.20: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.212	0.440	0.489	0.020	0.027	0.033	0.006	0.012	0.014
Flat-top taper	0.128	0.526	0.542	0.006	0.158	0.158	0.002	0.079	0.080
Local ($\widehat{\delta}_*$)	0.136	0.305	0.334	0.010	0.047	0.048	0.003	0.017	0.018

Table B.21: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.405	1.347	1.406	-0.216	0.708	0.740	-0.139	0.362	0.388
Flat-top taper	-0.091	1.588	1.591	0.011	0.717	0.717	0.003	0.315	0.315
Local ($\widehat{\delta}_*$)	-0.320	1.175	1.217	-0.190	0.592	0.622	-0.105	0.300	0.318

Table B.22: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.364	0.451	0.579	0.029	0.128	0.131	0.014	0.056	0.058
Flat-top taper	0.306	0.509	0.595	0.004	0.146	0.146	0.000	0.063	0.063
Local ($\widehat{\delta}_*$)	0.186	0.305	0.357	0.026	0.128	0.131	0.009	0.057	0.058

Table B.23: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.406	0.782	0.881	-0.135	0.368	0.392	-0.080	0.201	0.216
Flat-top taper	-0.314	0.924	0.976	-0.007	0.368	0.368	0.001	0.170	0.170
Local ($\widehat{\delta}_*$)	-0.176	0.653	0.677	-0.119	0.312	0.334	-0.064	0.167	0.179

Table B.24: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.032	0.231	0.233	-0.007	0.109	0.109	-0.002	0.054	0.054
Flat-top taper	-0.035	0.244	0.246	-0.007	0.112	0.112	-0.002	0.054	0.054
Local ($\widehat{\delta}_*$)	-0.009	0.319	0.319	0.001	0.155	0.155	-0.001	0.076	0.076

Table B.25: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.017	0.242	0.243	-0.004	0.111	0.111	-0.002	0.053	0.053
Flat-top taper	-0.016	0.263	0.264	-0.004	0.115	0.115	-0.002	0.054	0.054
Local ($\widehat{\delta}_*$)	0.001	0.331	0.331	-0.001	0.155	0.155	-0.001	0.076	0.076

Table B.26: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.551	0.679	0.874	-0.163	0.387	0.420	-0.081	0.210	0.225
Flat-top taper	-0.507	0.755	0.910	-0.053	0.370	0.374	-0.011	0.167	0.168
Local ($\widehat{\delta}_*$)	-0.230	0.569	0.613	-0.130	0.314	0.340	-0.067	0.165	0.178

Table B.27: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.451	0.405	0.606	0.056	0.131	0.143	0.025	0.053	0.059
Flat-top taper	0.391	0.476	0.616	0.018	0.152	0.153	0.003	0.064	0.064
Local ($\widehat{\delta}_*$)	0.174	0.261	0.314	0.026	0.128	0.131	0.008	0.056	0.056

Table B.28: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.709	1.163	1.361	-0.284	0.695	0.750	-0.139	0.378	0.403
Flat-top taper	-0.483	1.291	1.378	-0.081	0.654	0.659	-0.017	0.307	0.308
Local ($\widehat{\delta}_*$)	-0.463	0.946	1.053	-0.222	0.557	0.599	-0.110	0.295	0.315

Table B.29: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.292	0.487	0.567	0.031	0.030	0.043	0.010	0.016	0.019
Flat-top taper	0.225	0.557	0.601	0.025	0.154	0.156	0.006	0.079	0.079
Local ($\widehat{\delta}_*$)	0.148	0.279	0.315	0.009	0.042	0.043	0.002	0.017	0.017

Table B.30: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.812	0.390	0.901	0.486	0.386	0.620	0.127	0.090	0.155
Flat-top taper	0.803	0.410	0.902	0.570	0.335	0.661	0.317	0.172	0.361
Local ($\widehat{\delta}_*$)	0.619	0.346	0.709	0.456	0.261	0.525	0.235	0.174	0.292

Table B.31: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.251	0.452	0.518	-0.107	0.308	0.326	-0.019	0.156	0.157
Flat-top taper	-0.234	0.532	0.581	-0.027	0.388	0.389	0.056	0.210	0.217
Local ($\widehat{\delta}_*$)	0.059	0.492	0.496	0.061	0.266	0.273	0.001	0.155	0.155

Table B.32: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.438	0.291	0.526	-0.387	0.217	0.444	-0.295	0.203	0.358
Flat-top taper	-0.437	0.303	0.532	-0.388	0.214	0.444	-0.316	0.185	0.366
Local ($\widehat{\delta}_*$)	-0.305	0.371	0.480	-0.272	0.203	0.339	-0.255	0.131	0.286

Table B.33: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.097	0.237	0.256	0.113	0.134	0.176	0.072	0.105	0.128
Flat-top taper	0.093	0.260	0.277	0.105	0.157	0.189	0.047	0.140	0.147
Local ($\widehat{\delta}_*$)	-0.033	0.295	0.297	-0.038	0.143	0.148	-0.030	0.070	0.076

Table B.34: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.573	1.488	2.165	-0.691	1.137	1.330	-0.302	0.677	0.741
Flat-top taper	-1.531	1.599	2.214	-0.682	1.226	1.403	-0.265	0.679	0.729
Local ($\widehat{\delta}_*$)	-1.622	1.258	2.053	-0.884	1.074	1.391	-0.389	0.626	0.737

Table B.35: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.133	0.346	0.371	0.037	0.161	0.165	0.039	0.116	0.122
Flat-top taper	-0.094	0.474	0.483	-0.079	0.216	0.230	0.012	0.082	0.083
Local ($\widehat{\delta}_*$)	-0.001	0.278	0.278	-0.003	0.132	0.132	-0.013	0.061	0.063

Table B.36: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.791	3.183	4.234	-1.215	2.351	2.646	-0.559	1.405	1.513
Flat-top taper	-2.591	3.582	4.421	-0.976	2.556	2.736	-0.357	1.434	1.478
Local ($\widehat{\delta}_*$)	-3.043	2.981	4.260	-1.426	2.185	2.609	-0.650	1.310	1.463

Table B.37: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.066	0.176	0.188	0.060	0.170	0.180	0.022	0.075	0.079
Flat-top taper	-0.341	0.447	0.562	0.019	0.206	0.207	-0.005	0.072	0.072
Local ($\widehat{\delta}_*$)	0.023	0.137	0.139	0.000	0.064	0.064	-0.006	0.038	0.038

Table B.38: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-4.619	5.329	7.052	-2.026	4.041	4.521	-0.946	2.432	2.610
Flat-top taper	-4.230	6.061	7.391	-1.562	4.369	4.639	-0.578	2.486	2.552
Local ($\widehat{\delta}_*$)	-4.937	5.005	7.030	-2.301	3.706	4.362	-1.074	2.265	2.507

Table B.39: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.103	0.188	0.214	0.070	0.212	0.223	0.014	0.048	0.049
Flat-top taper	-0.485	0.690	0.844	0.061	0.271	0.278	-0.014	0.099	0.100
Local ($\widehat{\delta}_*$)	0.035	0.109	0.115	0.004	0.044	0.044	-0.008	0.036	0.037

Table B.40: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.920	0.592	2.979	-2.517	1.111	2.751	-1.471	1.241	1.925
Flat-top taper	-2.915	0.636	2.984	-2.544	1.109	2.775	-1.654	1.209	2.048
Local ($\widehat{\delta}_*$)	-2.816	0.573	2.873	-2.512	0.916	2.674	-1.740	1.083	2.050

Table B.41: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.070	0.248	0.257	0.075	0.180	0.195	0.009	0.148	0.148
Flat-top taper	0.066	0.279	0.287	0.068	0.219	0.229	0.000	0.180	0.180
Local ($\widehat{\delta}_*$)	-0.077	0.308	0.317	-0.087	0.171	0.192	-0.024	0.121	0.123

Table B.42: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-27.245	8.605	28.572	-14.114	14.663	20.352	-5.857	12.711	13.995
Flat-top taper	-26.169	10.423	28.168	-11.188	17.699	20.939	-3.063	14.367	14.690
Local ($\widehat{\delta}_*$)	-27.462	8.984	28.894	-14.377	14.987	20.768	-6.101	12.401	13.821

Table B.43: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.038	0.325	0.328	-0.002	0.240	0.240	-0.003	0.167	0.168
Flat-top taper	-0.025	0.433	0.434	0.010	0.288	0.289	0.003	0.193	0.193
Local ($\widehat{\delta}_*$)	-0.037	0.293	0.296	-0.021	0.184	0.186	-0.025	0.117	0.120

Table B.44: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-75.194	23.199	78.692	-38.713	39.337	55.191	-16.217	36.316	39.772
Flat-top taper	-71.163	28.405	76.622	-29.120	48.288	56.388	-7.485	41.580	42.248
Local ($\widehat{\delta}_*$)	-75.265	24.480	79.146	-38.420	40.595	55.893	-16.151	35.582	39.076

Table B.45: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.073	0.265	0.274	0.017	0.154	0.155	0.004	0.095	0.095
Flat-top taper	0.026	0.343	0.344	0.028	0.175	0.177	0.009	0.108	0.108
Local ($\widehat{\delta}_*$)	0.034	0.210	0.212	-0.002	0.108	0.108	-0.013	0.070	0.071

Table B.46: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-147.167	45.659	154.087	-75.840	79.586	109.935	-30.992	71.468	77.899
Flat-top taper	-138.823	55.966	149.679	-56.383	98.019	113.079	-13.223	81.932	82.993
Local ($\widehat{\delta}_*$)	-146.831	48.517	154.639	-74.806	82.201	111.144	-30.357	70.214	76.496

Table B.47: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.139	0.307	0.337	0.027	0.073	0.078	0.007	0.038	0.039
Flat-top taper	0.108	0.447	0.459	0.056	0.140	0.151	0.017	0.058	0.061
Local ($\widehat{\delta}_*$)	0.089	0.208	0.226	0.011	0.072	0.073	-0.002	0.033	0.033

Table B.48: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-242.617	76.934	254.523	-124.558	130.306	180.262	-53.635	117.282	128.964
Flat-top taper	-228.498	94.459	247.252	-92.141	160.428	185.006	-24.446	135.109	137.303
Local ($\widehat{\delta}_*$)	-241.707	82.041	255.251	-123.420	133.012	181.452	-52.729	115.251	126.740

Table B.49: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.224	0.465	0.516	0.045	0.083	0.094	0.011	0.013	0.017
Flat-top taper	0.165	0.677	0.696	0.092	0.203	0.223	0.028	0.074	0.079
Local ($\widehat{\delta}_*$)	0.142	0.280	0.314	0.019	0.091	0.093	-0.002	0.034	0.034

Table B.50: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

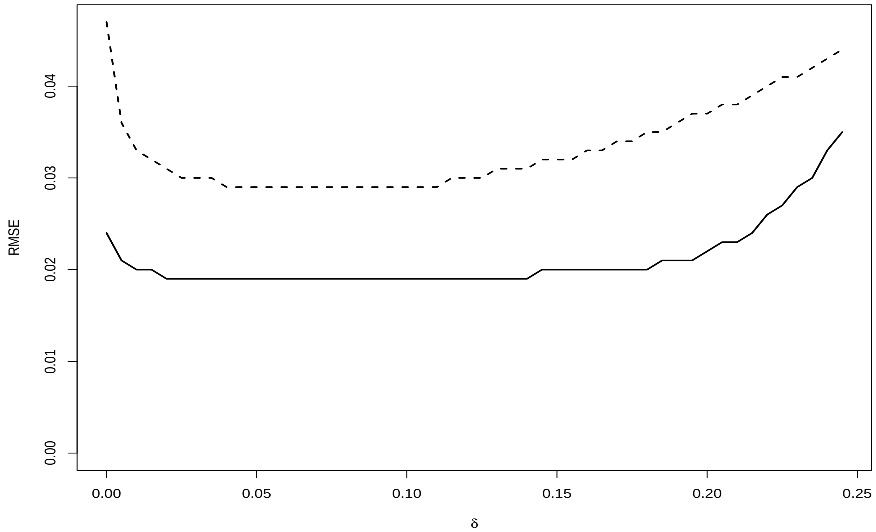

Figure B.1: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$.

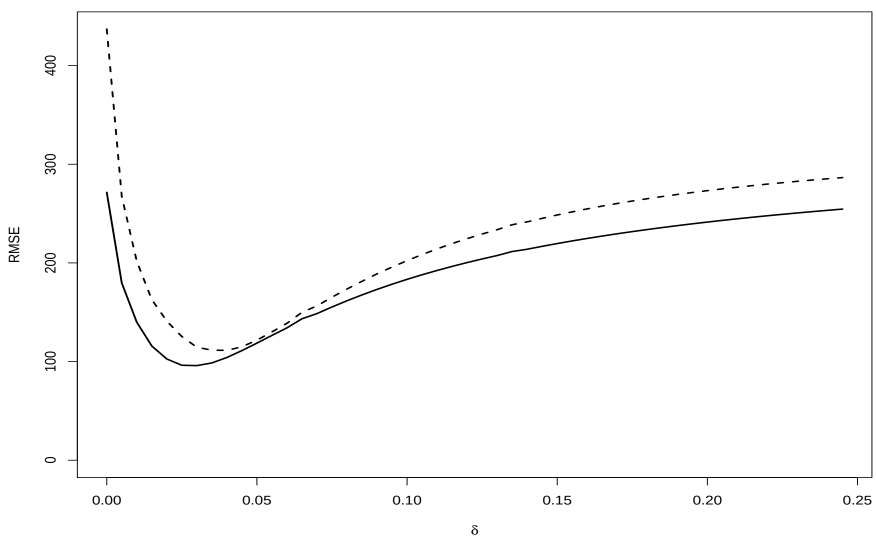

Figure B.2: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$.

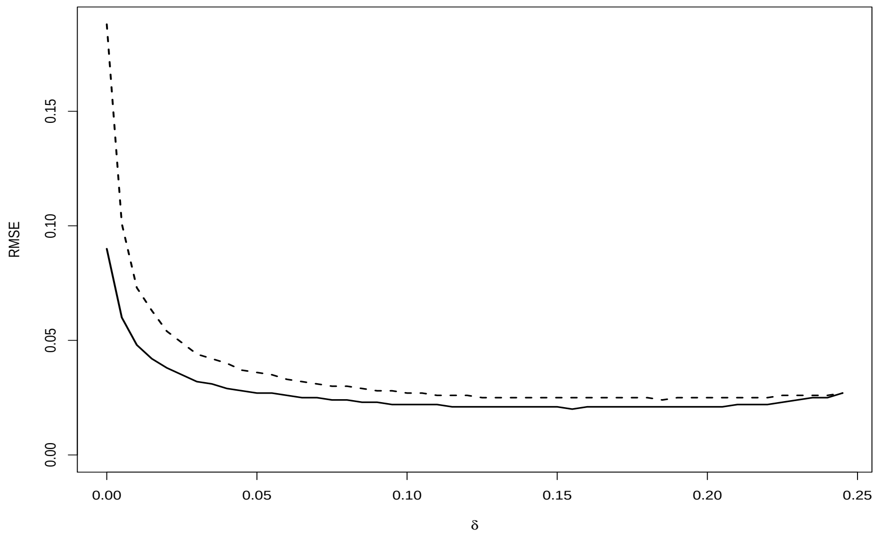

Figure B.3: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$.

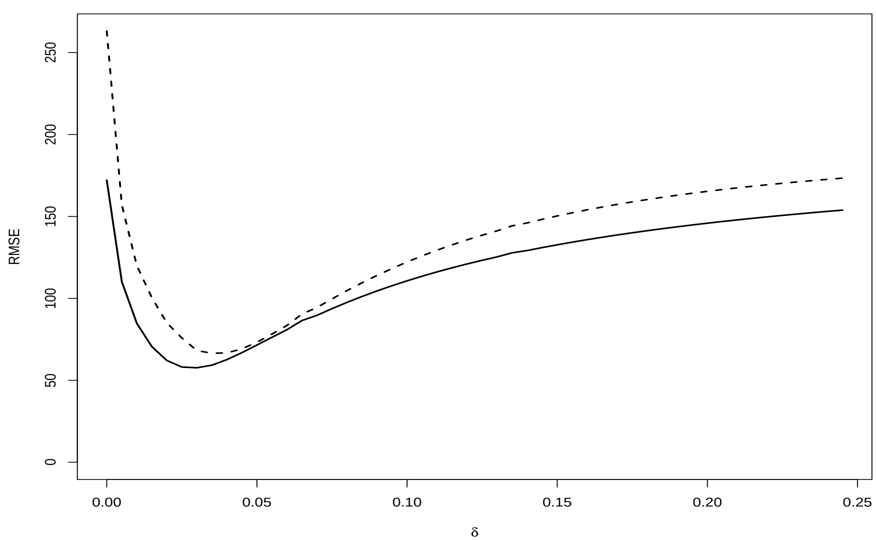

Figure B.4: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$.

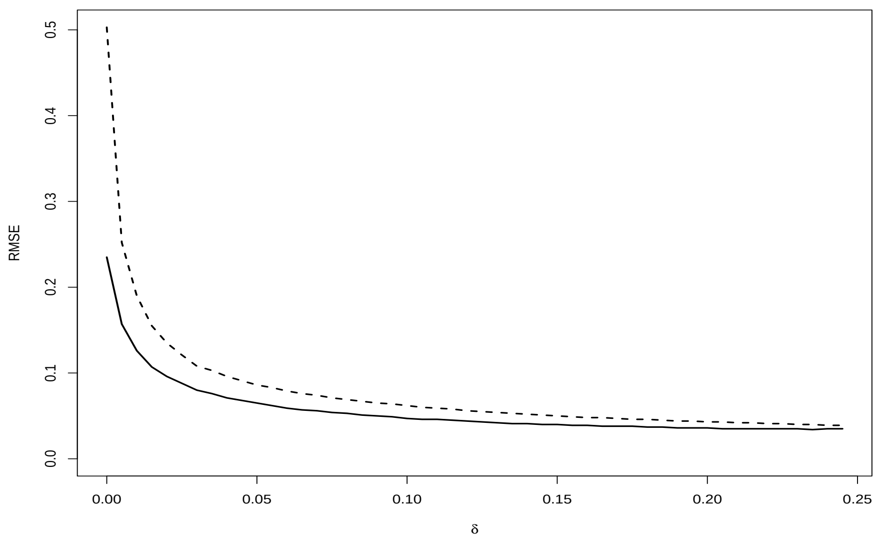

Figure B.5: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$.

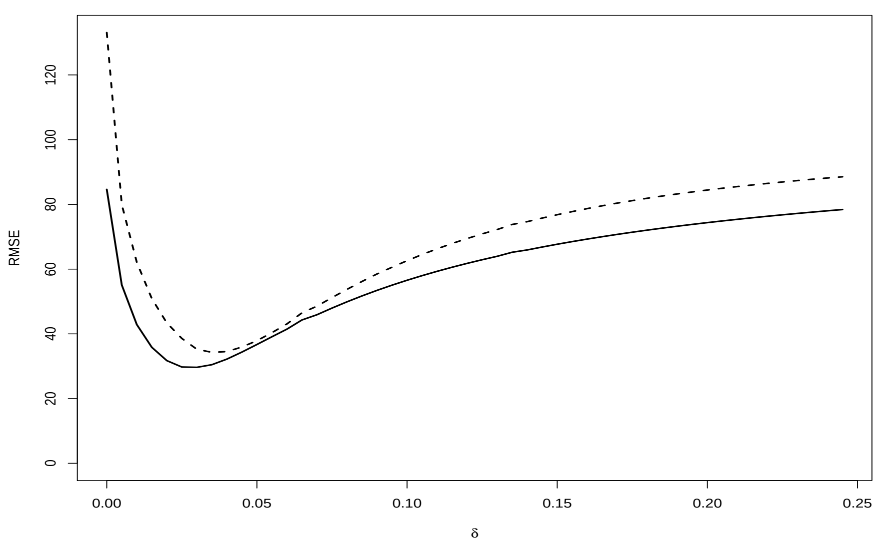

Figure B.6: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$.

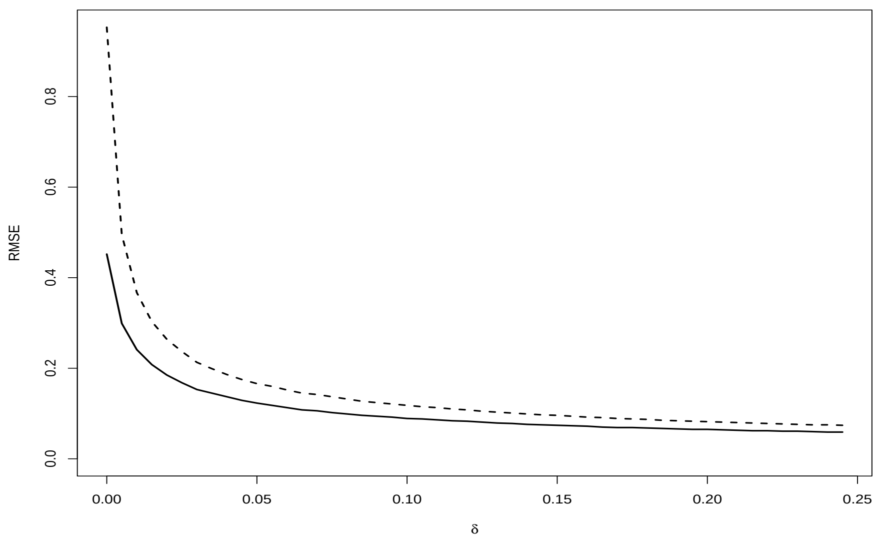

Figure B.7: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$.

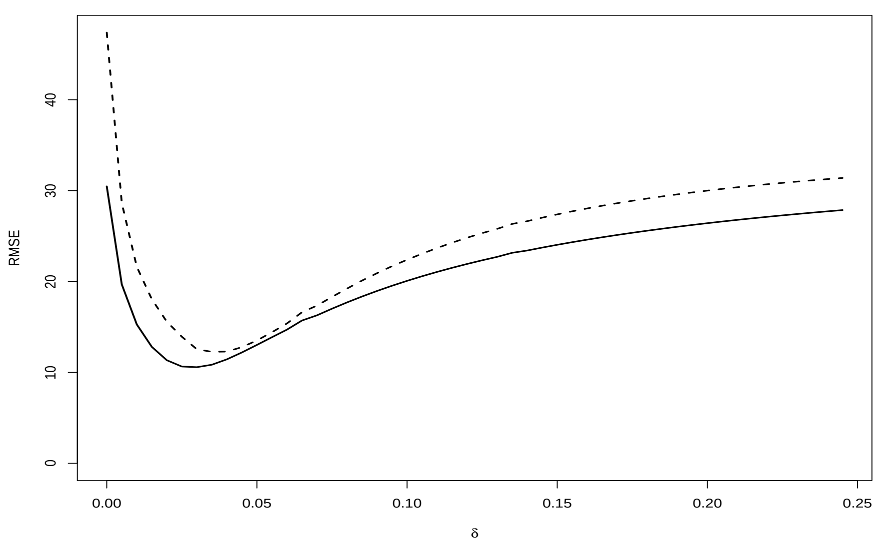

Figure B.8: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$.

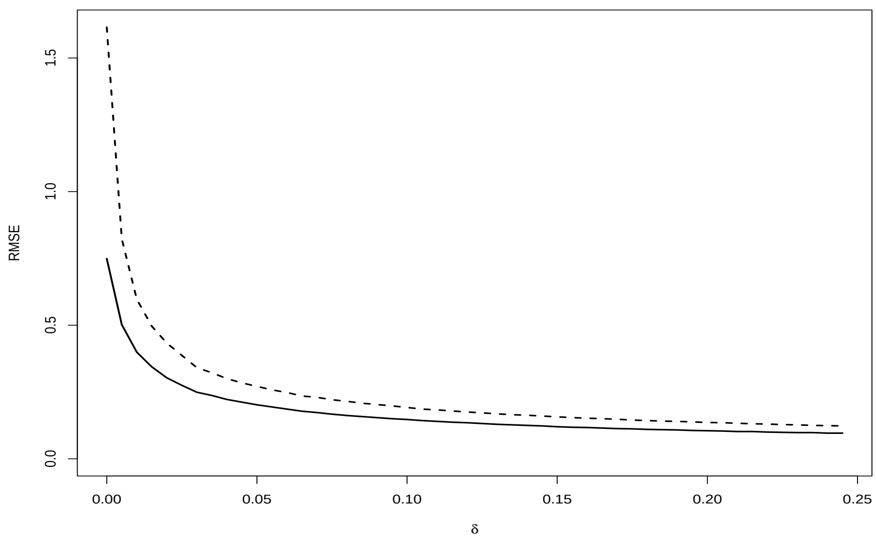

Figure B.9: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$.

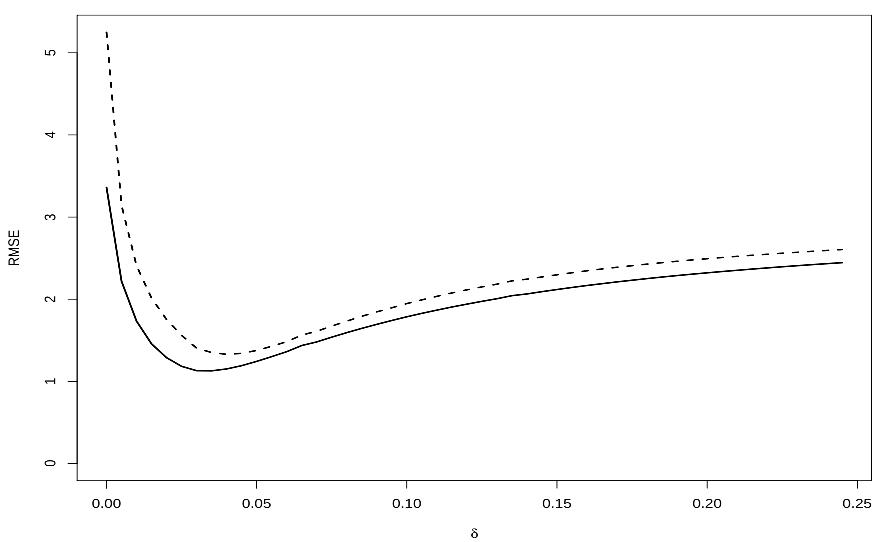

Figure B.10: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$.

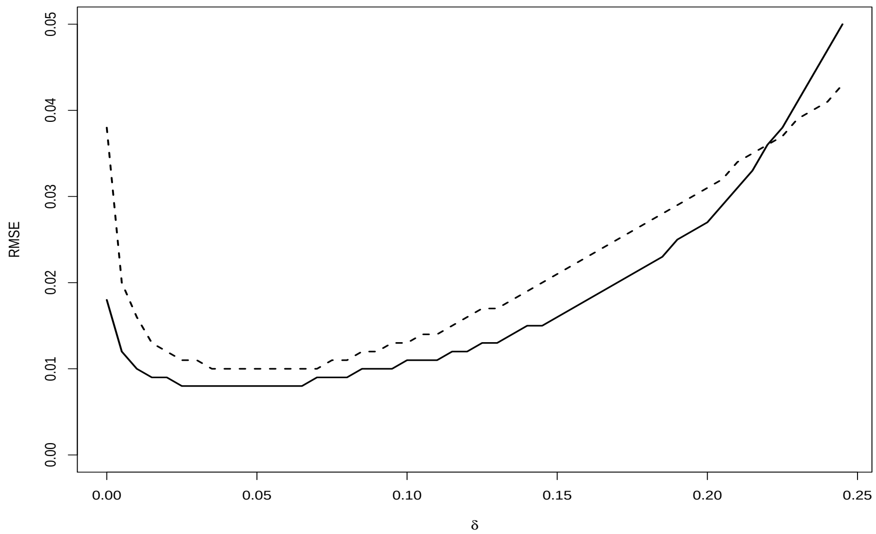

Figure B.11: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$.

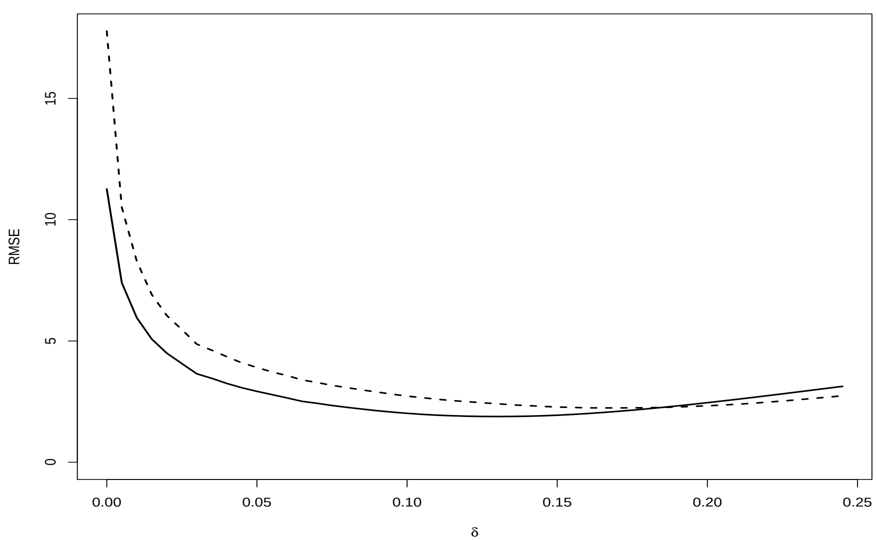

Figure B.12: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$.

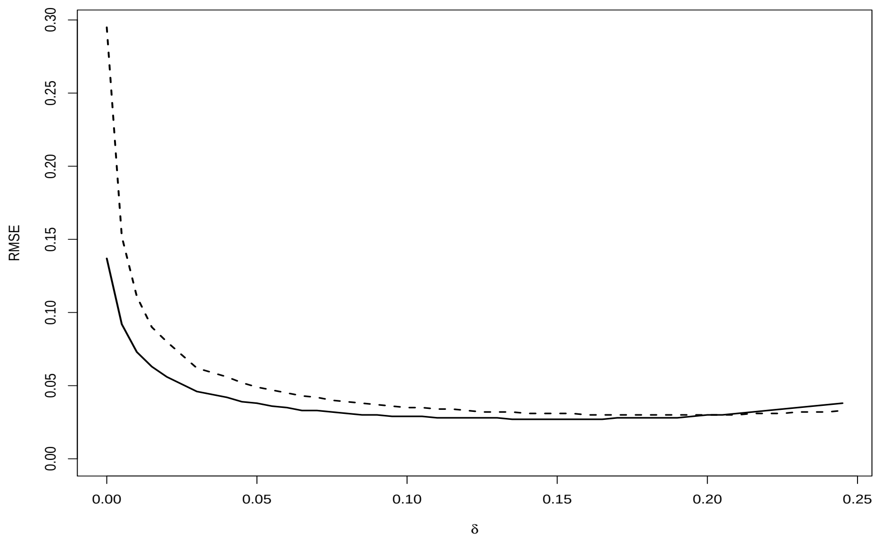

Figure B.13: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$.

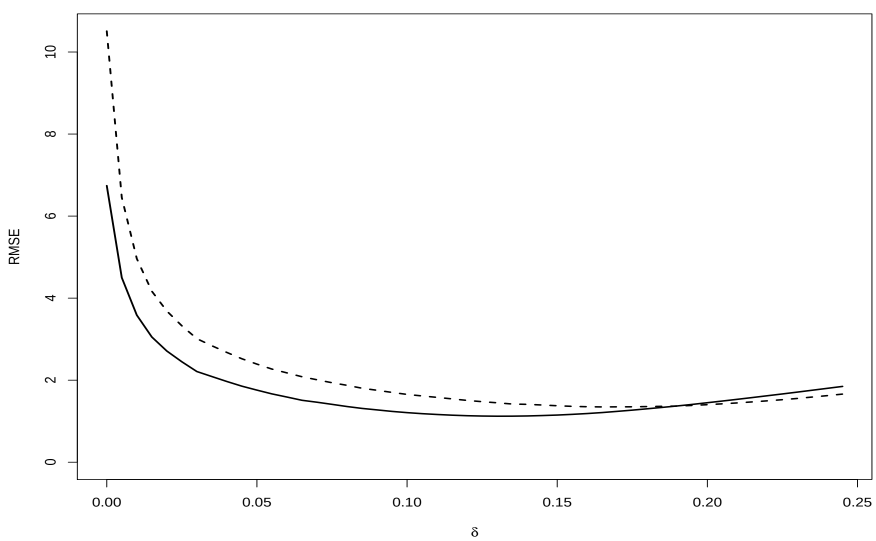

Figure B.14: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$.

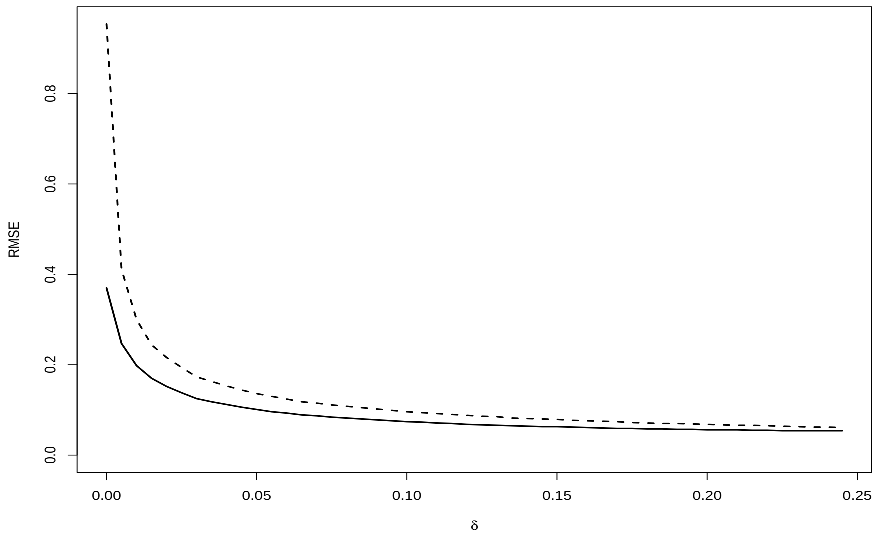

Figure B.15: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$.

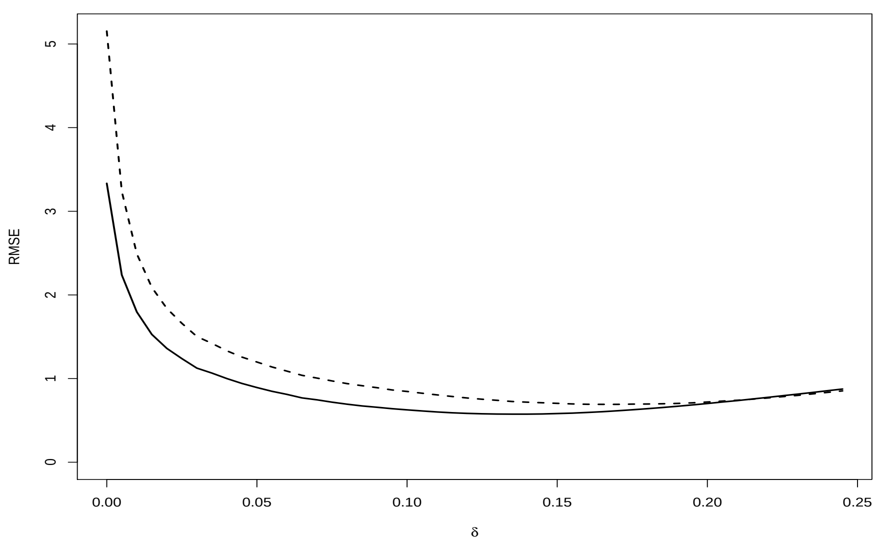

Figure B.16: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$.

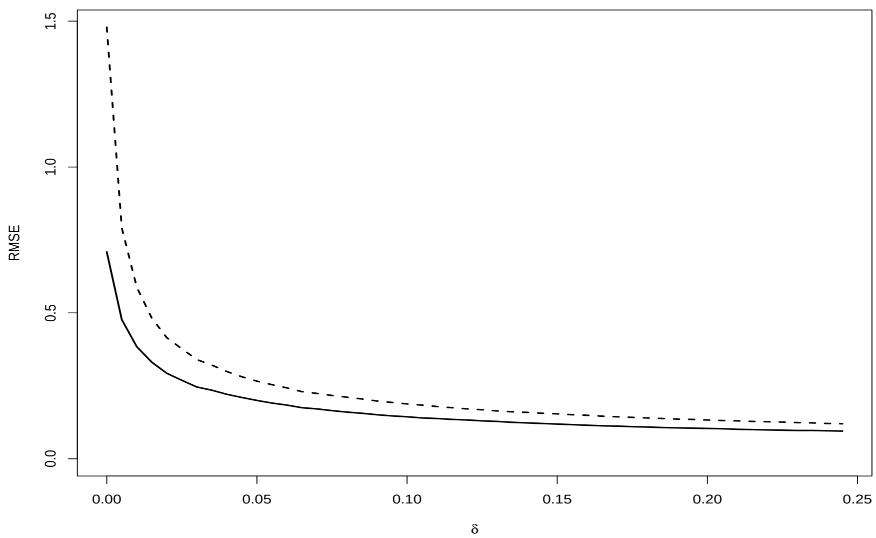

Figure B.17: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$.

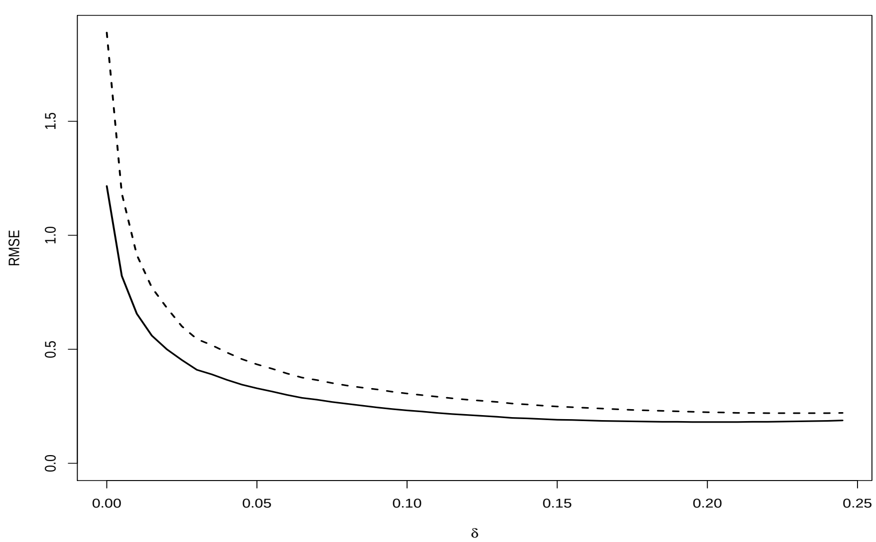

Figure B.18: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$.

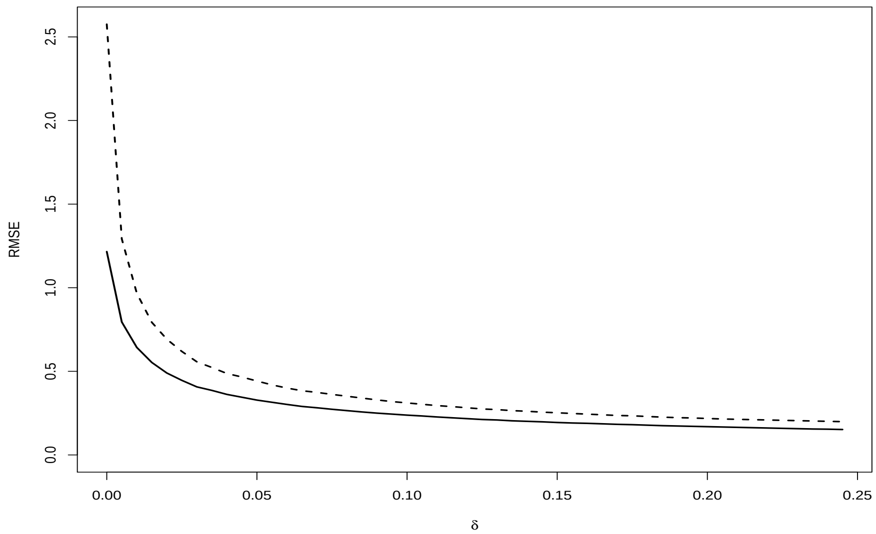

Figure B.19: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$.

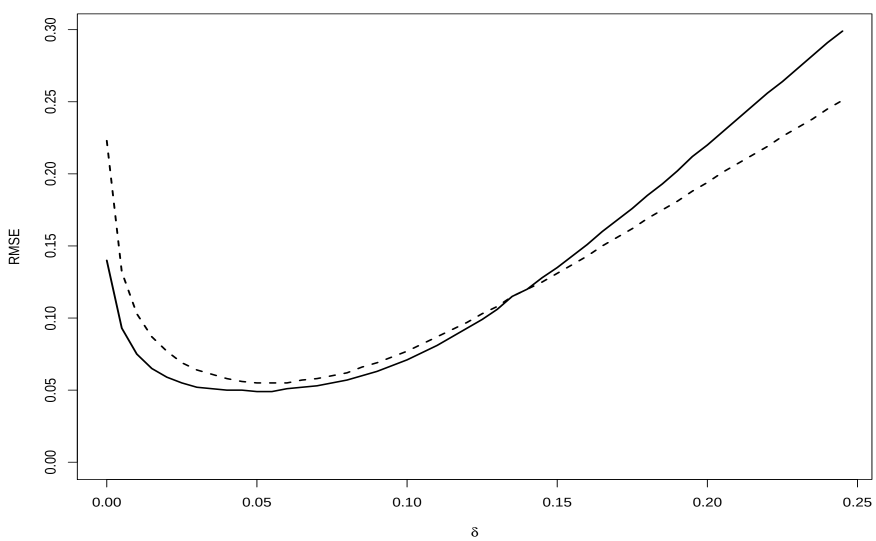

Figure B.20: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$.

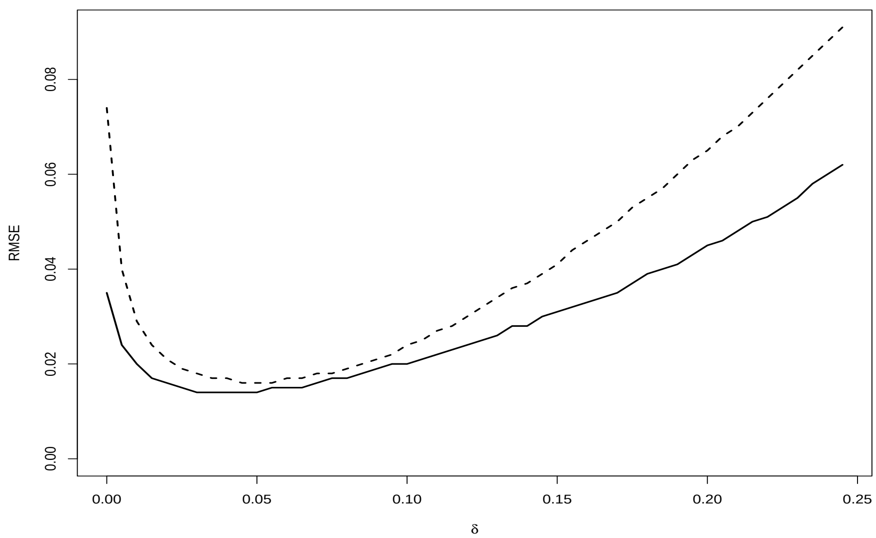

Figure B.21: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$.

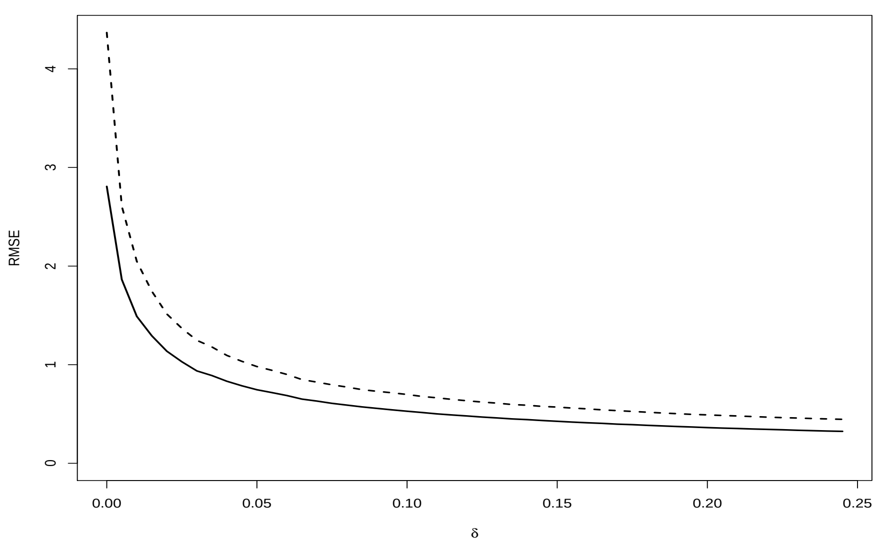

Figure B.22: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$.

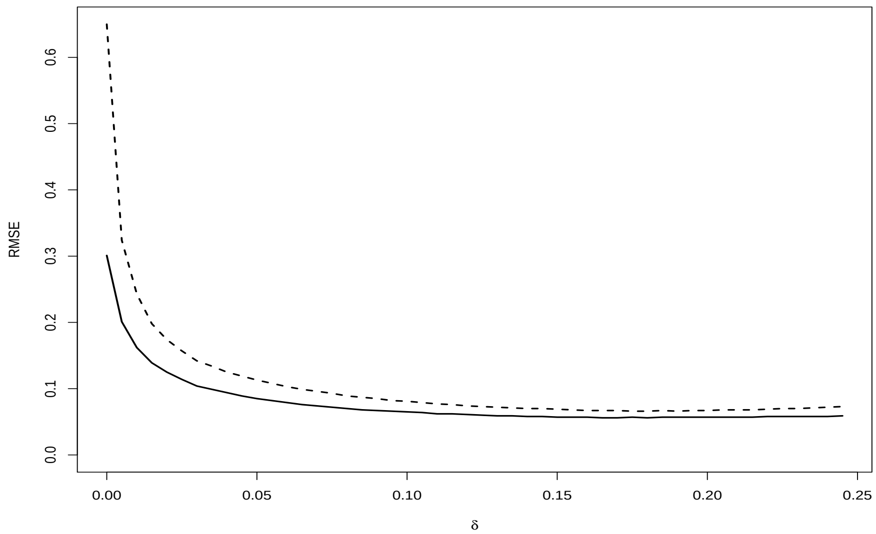

Figure B.23: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$.

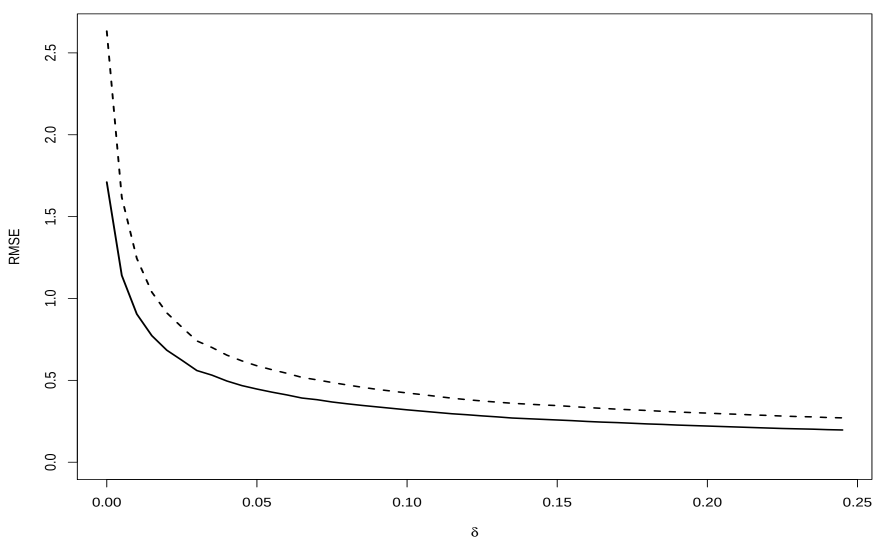

Figure B.24: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$.

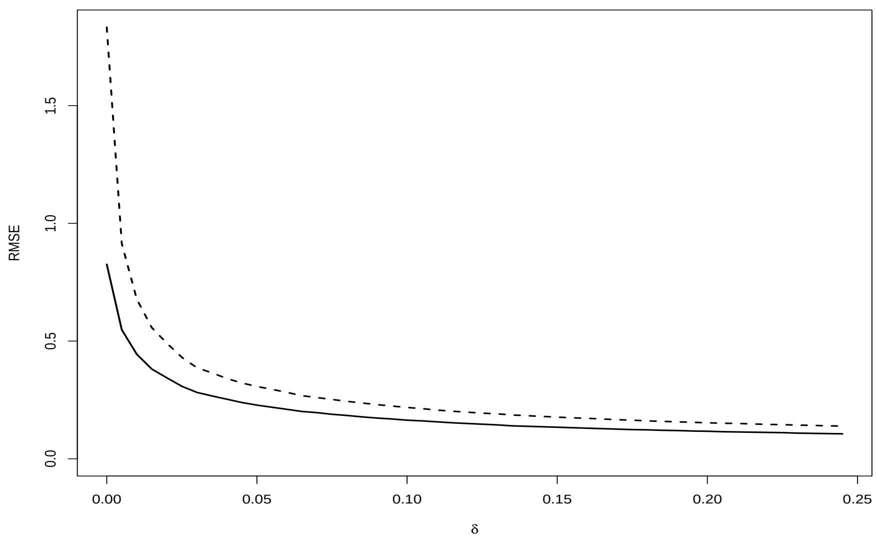

Figure B.25: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$.

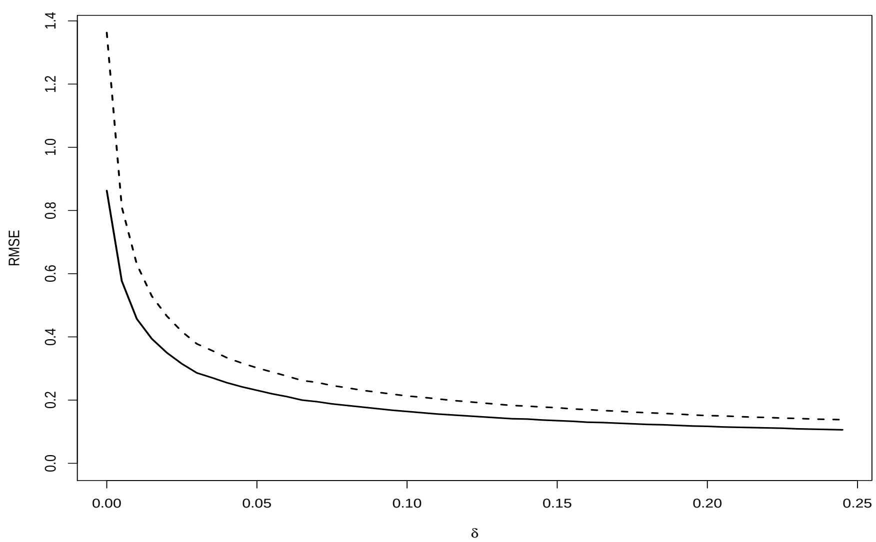

Figure B.26: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$.

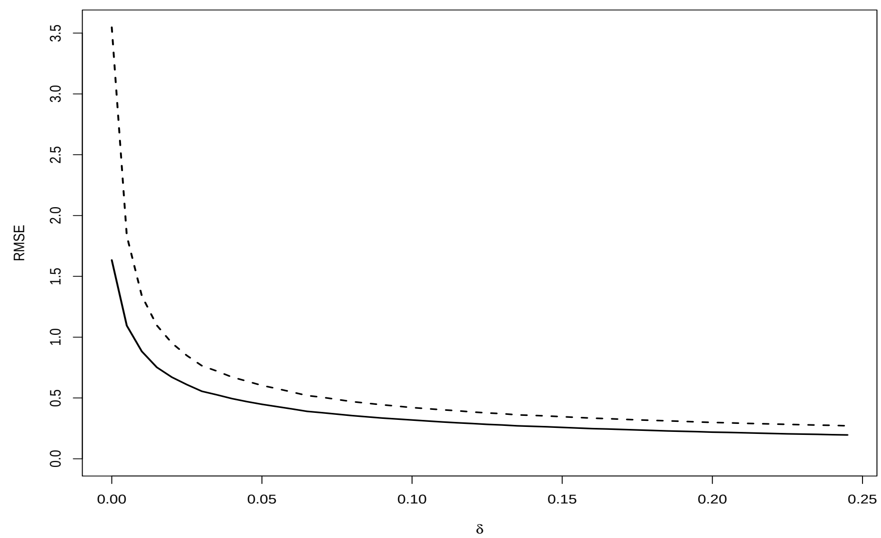

Figure B.27: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$.

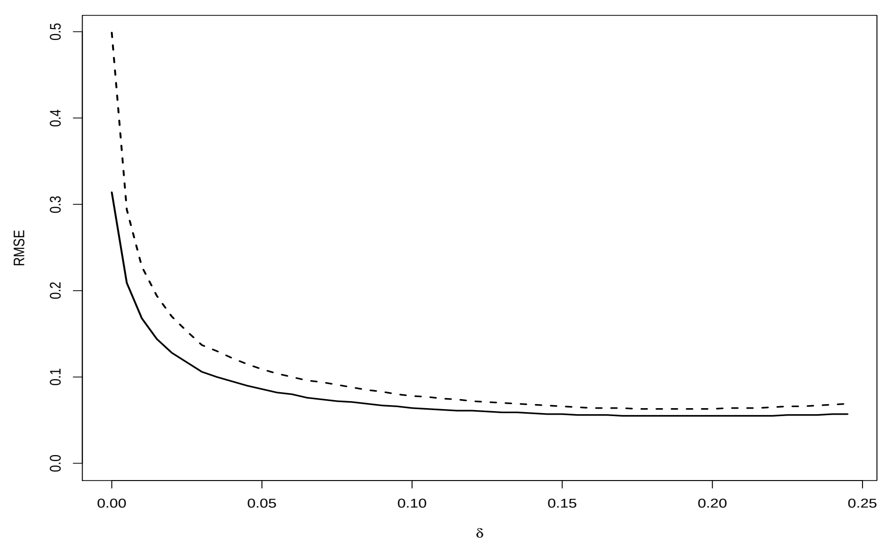

Figure B.28: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$.

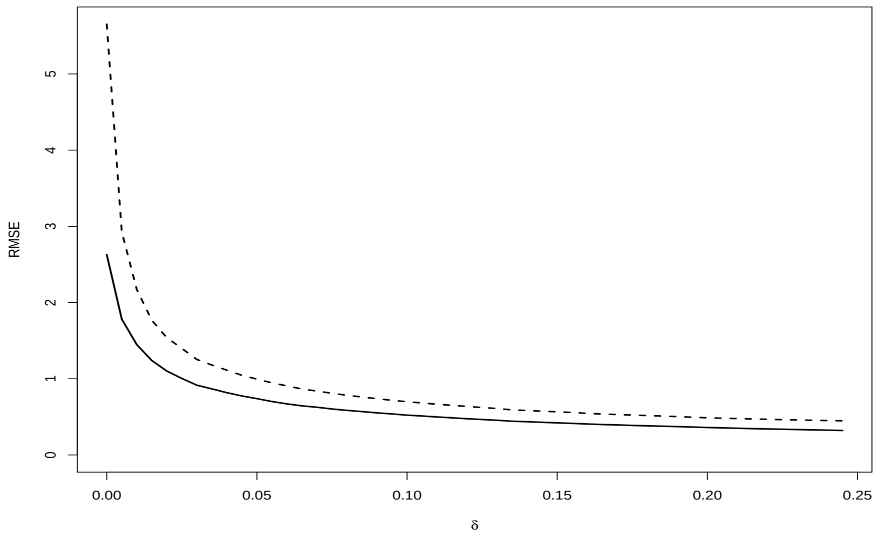

Figure B.29: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$.

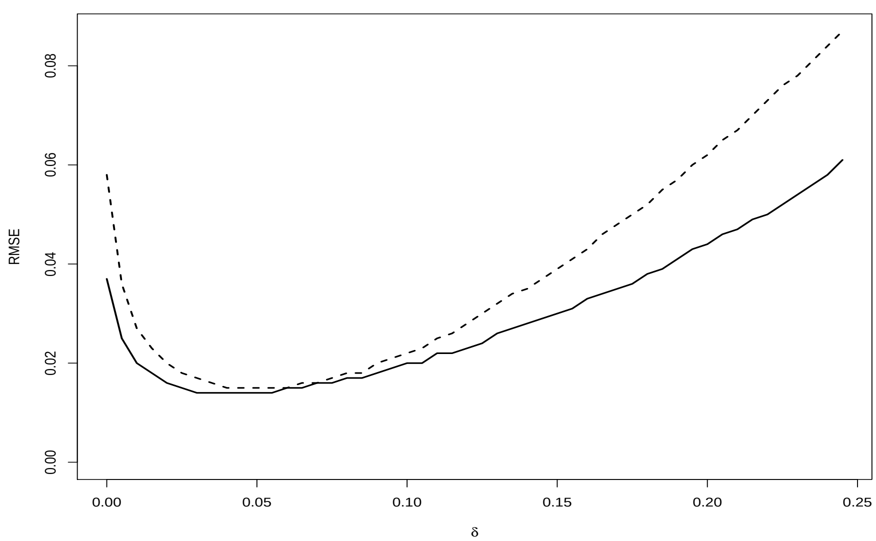

Figure B.30: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$.

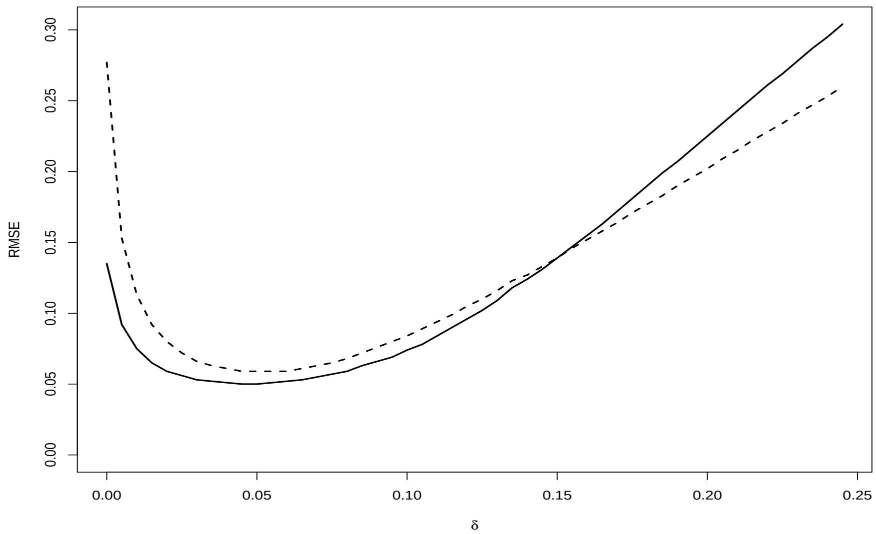

Figure B.31: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$.

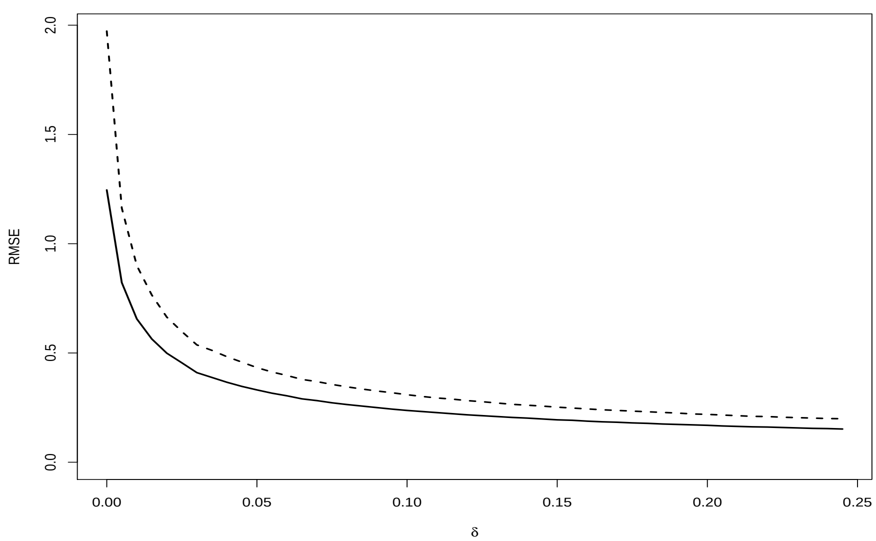

Figure B.32: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$.

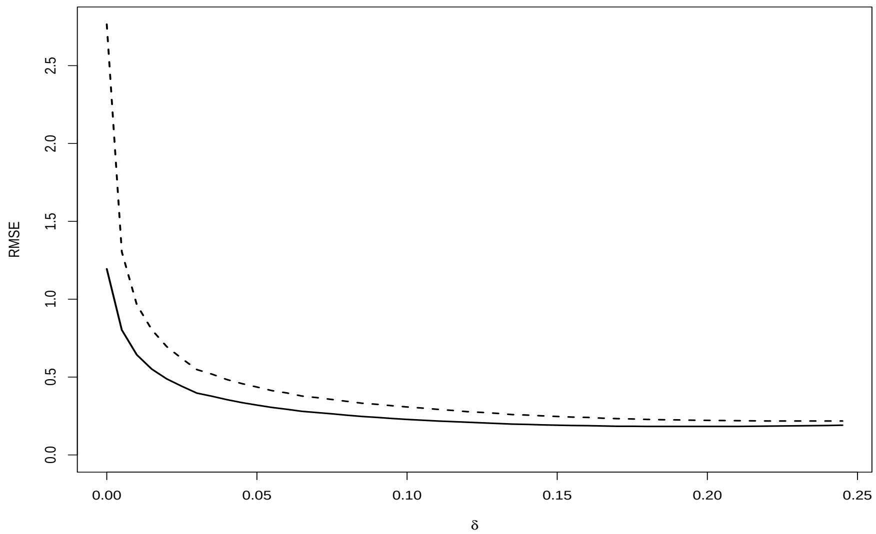

Figure B.33: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$.

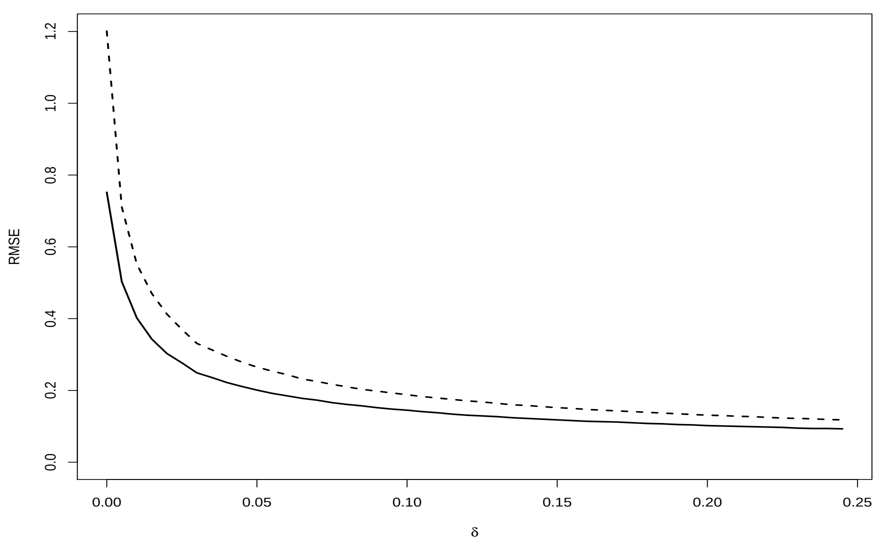

Figure B.34: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$.

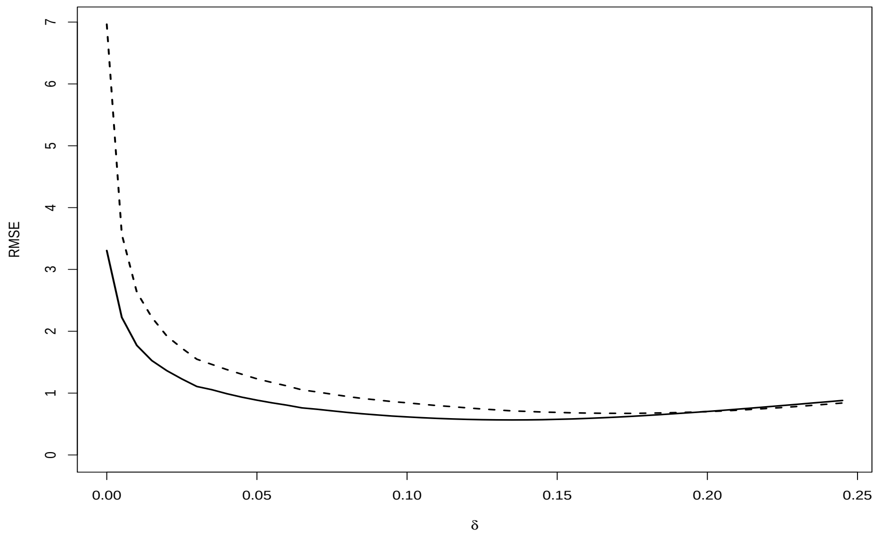

Figure B.35: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$.

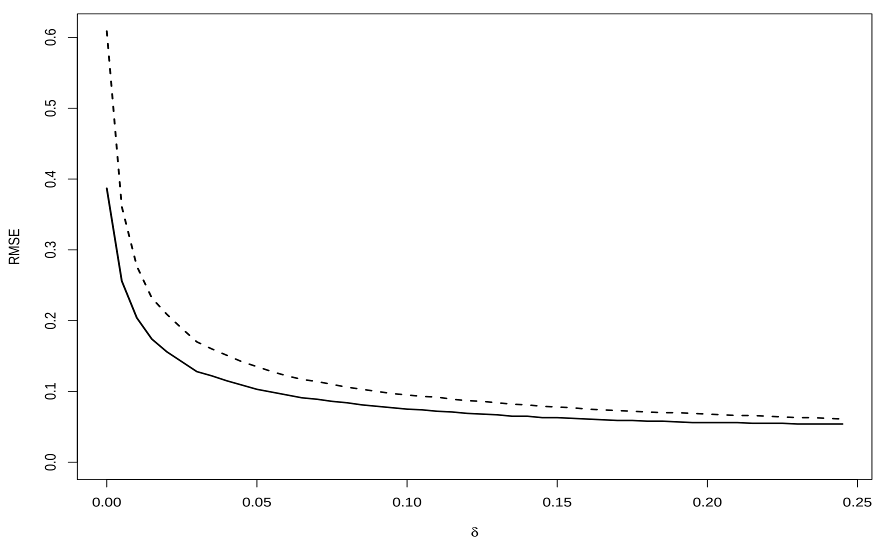

Figure B.36: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$.

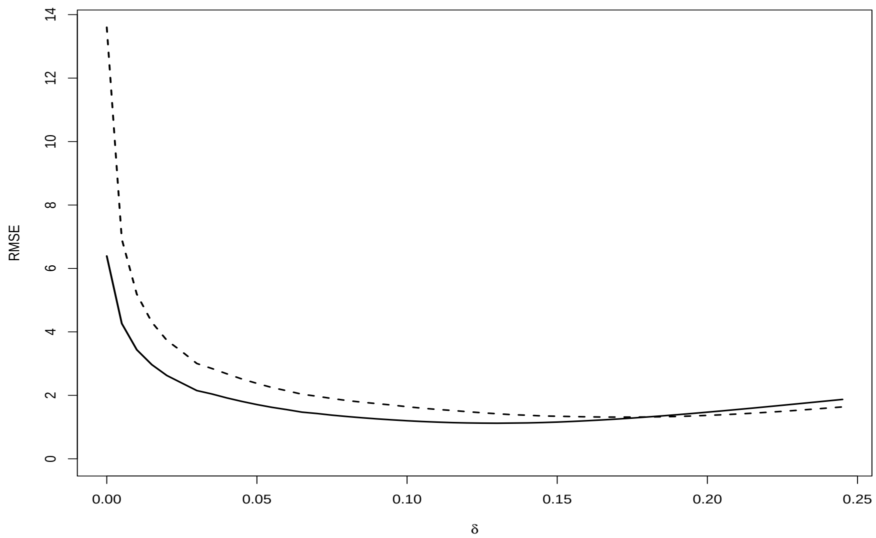

Figure B.37: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$.

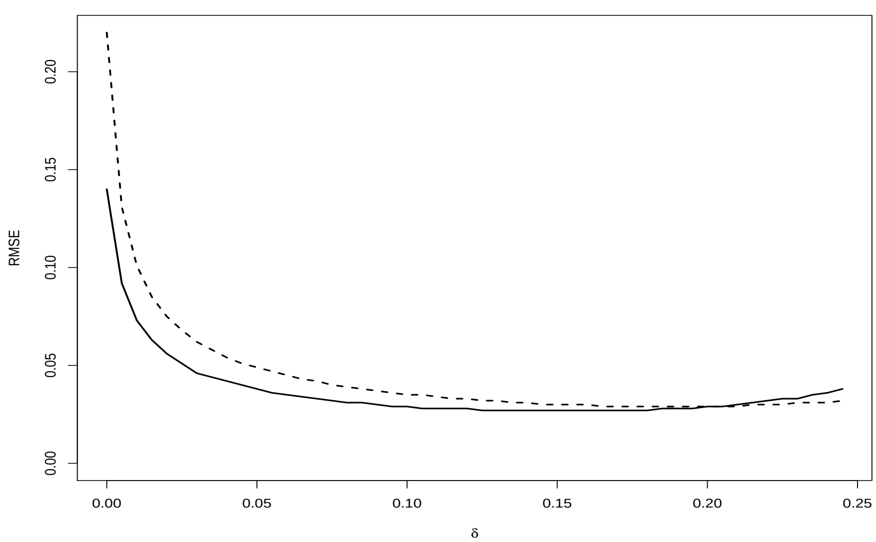

Figure B.38: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$.

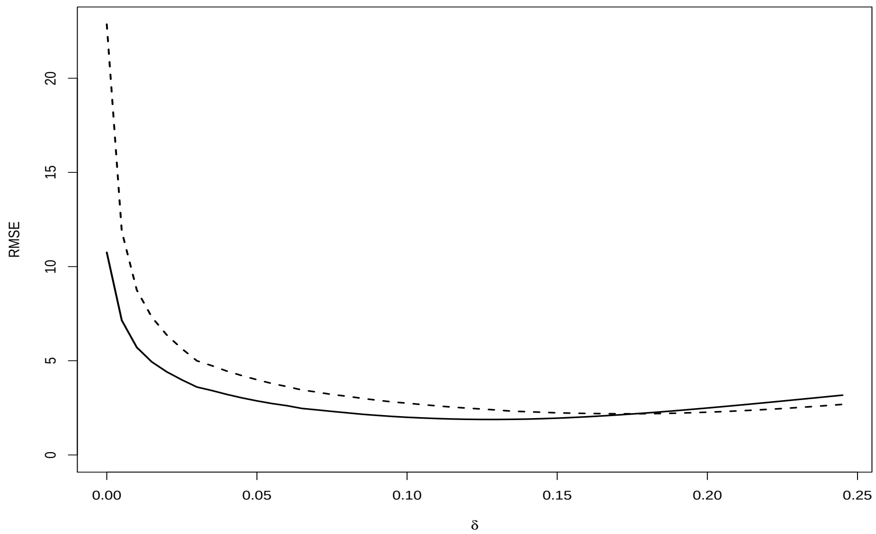

Figure B.39: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$.

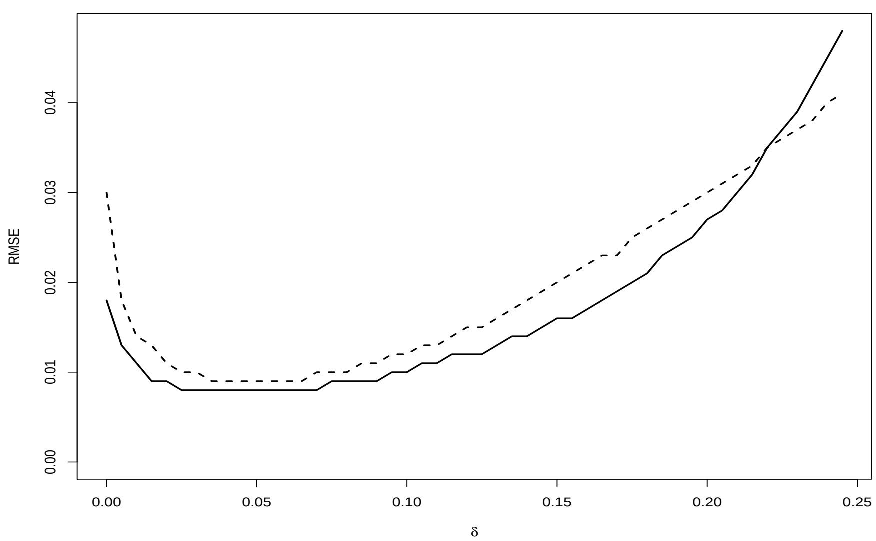

Figure B.40: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$.

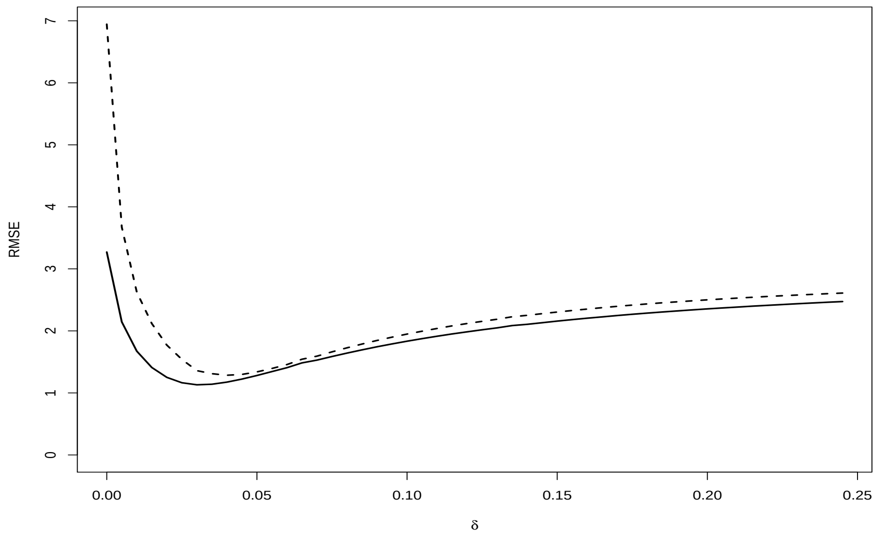

Figure B.41: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$.

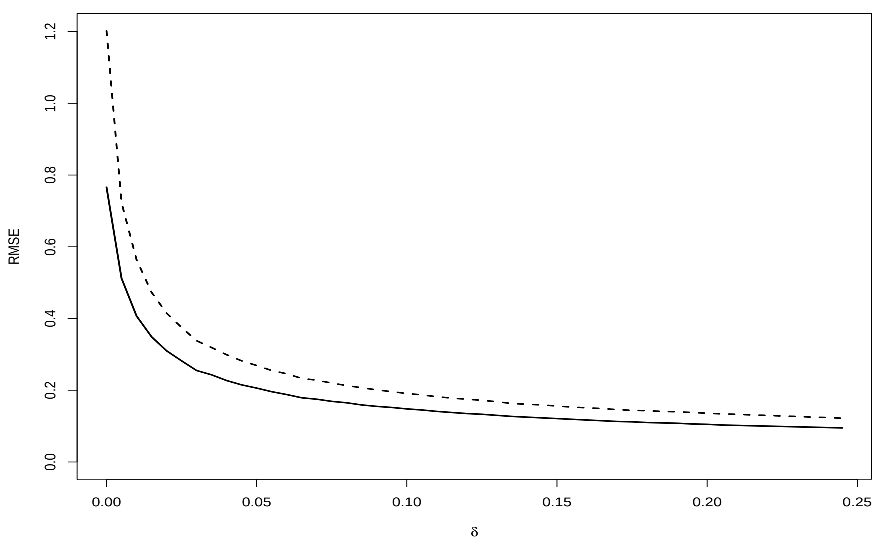

Figure B.42: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$.

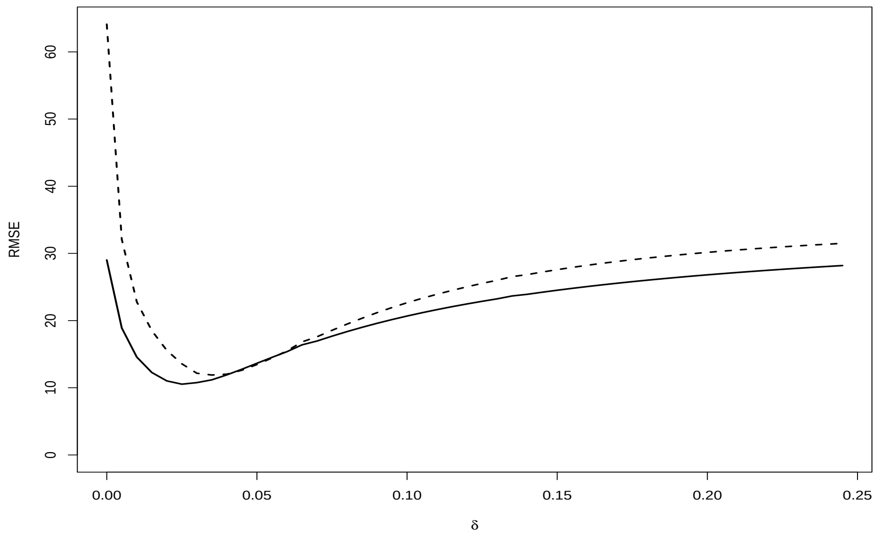

Figure B.43: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$.

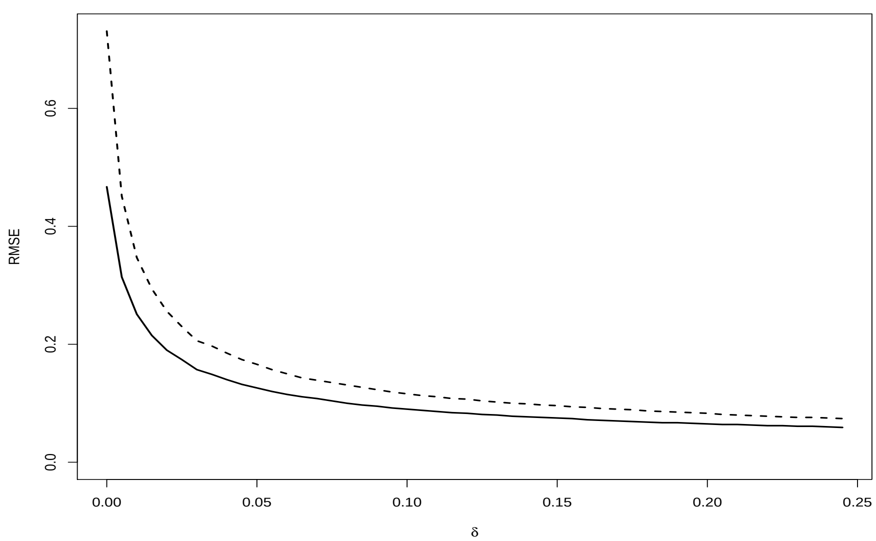

Figure B.44: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$.

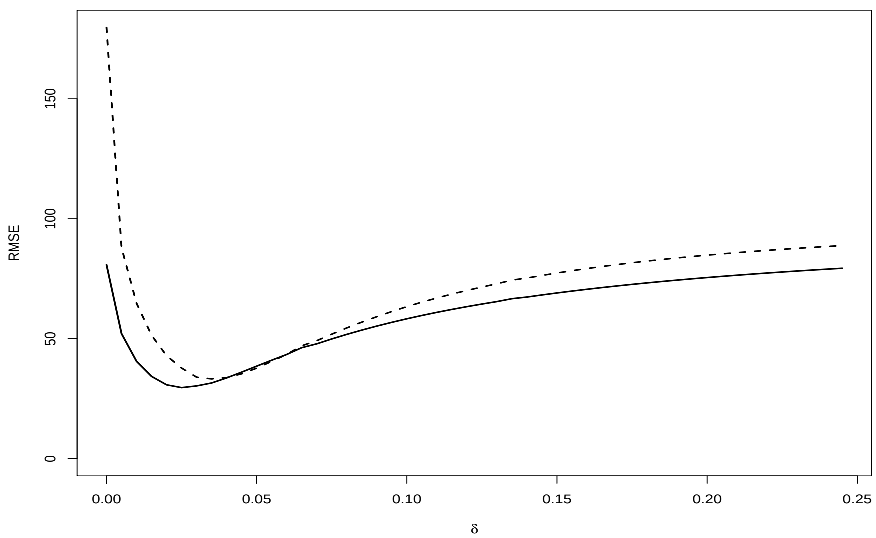

Figure B.45: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$.

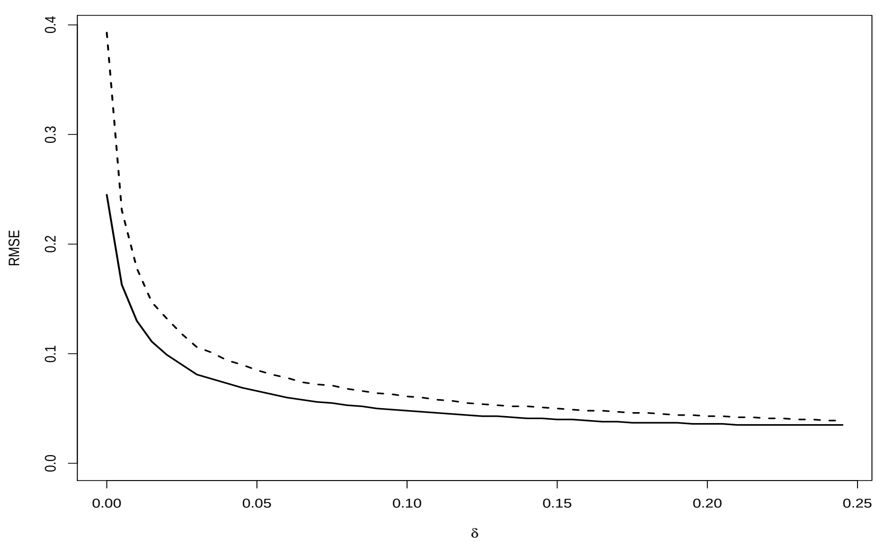

Figure B.46: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$.

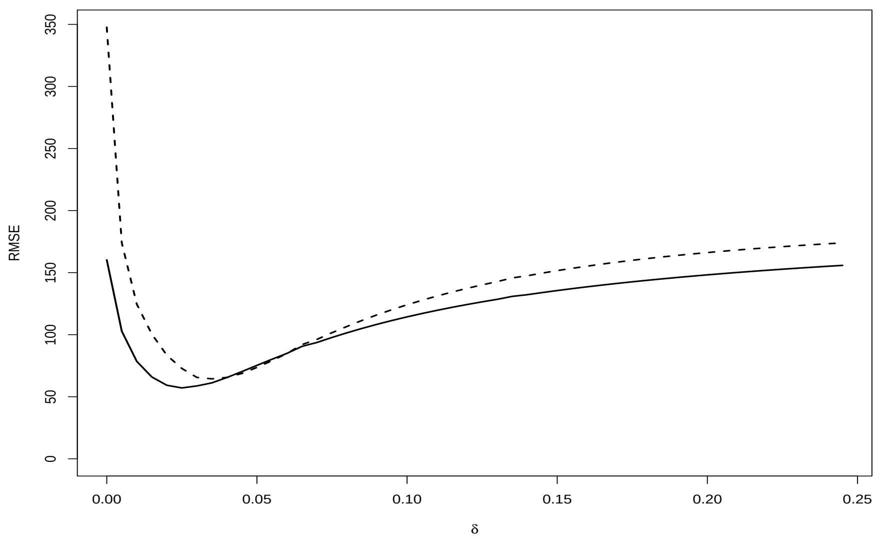

Figure B.47: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$.

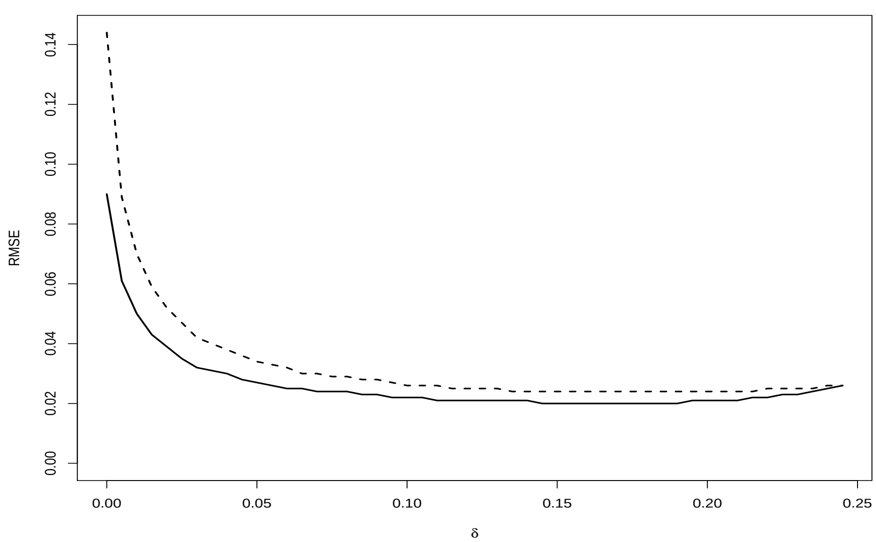

Figure B.48: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$.

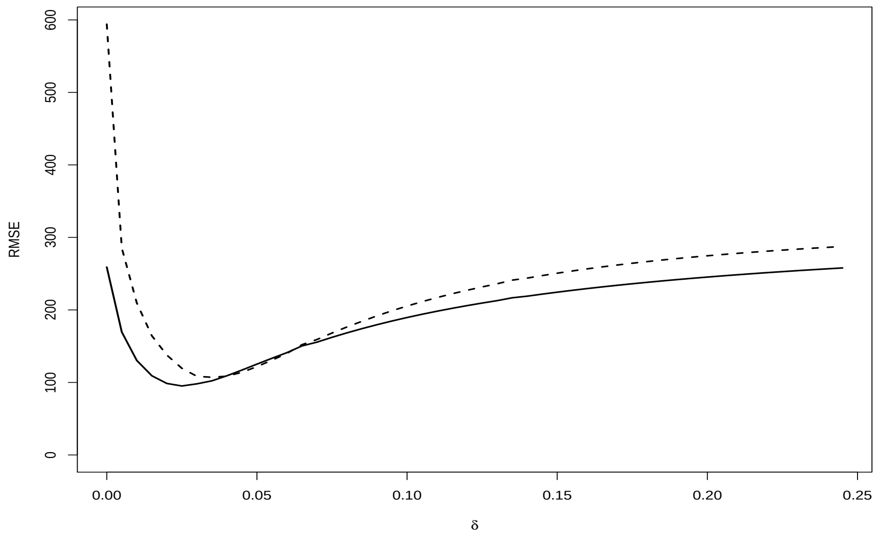

Figure B.49: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$.

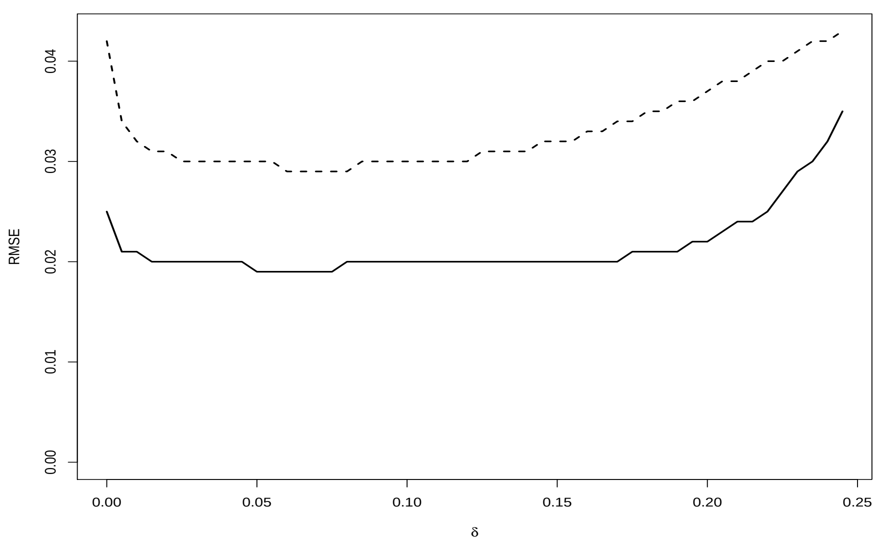

Figure B.50: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Gaussian ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$.

B.2 Laplace Process

Results are based on simulations of 25 Laplace ARMA processes described in the main paper. For the tables, the Local quadratic estimator $\widetilde{f}(\theta)$ is computed via OLS using the data-based optimal bandwidth $\widehat{\delta}_*$, which is determined by using the Flat-top tapered spectral estimator. For the figures, a range of fixed δ values are used, letting this quantity range from .005 to .250 in 50 increments.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.177	0.477	0.509	0.038	0.057	0.069	0.009	0.016	0.018
Flat-top taper	0.101	0.625	0.633	0.063	0.195	0.204	0.019	0.072	0.075
Local ($\widehat{\delta}_*$)	0.101	0.352	0.366	0.011	0.104	0.105	-0.003	0.037	0.037

Table B.51: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-124.941	230.955	262.584	-47.257	235.564	240.257	-25.712	152.922	155.069
Flat-top taper	-58.019	334.387	339.383	19.555	325.409	325.996	16.984	189.019	189.781
Local ($\widehat{\delta}_*$)	-158.811	192.135	249.273	-76.209	196.687	210.935	-33.852	139.793	143.834

Table B.52: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.067	0.220	0.230	-0.004	0.073	0.073	-0.005	0.042	0.042
Flat-top taper	0.029	0.405	0.406	0.017	0.135	0.136	0.005	0.059	0.059
Local ($\widehat{\delta}_*$)	0.051	0.246	0.251	0.000	0.080	0.080	-0.007	0.037	0.038

Table B.53: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-77.899	138.584	158.977	-29.353	137.129	140.236	-17.472	88.788	90.491
Flat-top taper	-38.615	200.248	203.937	10.400	187.945	188.233	7.505	107.679	107.940
Local ($\widehat{\delta}_*$)	-97.544	115.570	151.232	-46.984	114.071	123.368	-22.375	81.606	84.618

Table B.54: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.055	0.236	0.242	-0.052	0.149	0.158	-0.023	0.098	0.100
Flat-top taper	-0.095	0.301	0.316	-0.045	0.170	0.176	-0.018	0.107	0.108
Local ($\widehat{\delta}_*$)	-0.016	0.222	0.222	-0.036	0.114	0.120	-0.028	0.072	0.078

Table B.55: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-39.744	73.619	83.662	-14.792	71.292	72.811	-8.616	46.547	47.338
Flat-top taper	-19.916	106.215	108.066	5.143	97.861	97.996	3.941	56.590	56.727
Local ($\widehat{\delta}_*$)	-49.613	61.478	79.000	-23.767	59.389	63.968	-11.095	42.442	43.868

Table B.56: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.161	0.334	0.371	-0.109	0.261	0.283	-0.045	0.182	0.187
Flat-top taper	-0.209	0.387	0.439	-0.103	0.287	0.305	-0.040	0.194	0.198
Local ($\widehat{\delta}_*$)	-0.082	0.303	0.314	-0.068	0.189	0.201	-0.045	0.123	0.131

Table B.57: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-14.920	25.246	29.325	-6.267	24.670	25.454	-3.624	15.549	15.966
Flat-top taper	-8.601	35.994	37.008	-0.034	33.175	33.175	0.384	18.646	18.650
Local ($\widehat{\delta}_*$)	-18.130	21.105	27.823	-9.362	20.794	22.805	-4.710	14.279	15.036

Table B.58: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.048	0.384	0.387	0.045	0.244	0.248	-0.010	0.169	0.169
Flat-top taper	0.039	0.413	0.415	0.032	0.273	0.275	-0.018	0.190	0.190
Local ($\widehat{\delta}_*$)	-0.146	0.379	0.406	-0.099	0.201	0.224	-0.027	0.132	0.135

Table B.59: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.578	1.586	3.027	-2.245	1.557	2.733	-1.420	1.263	1.900
Flat-top taper	-2.500	1.964	3.179	-2.218	1.711	2.801	-1.508	1.290	1.985
Local ($\widehat{\delta}_*$)	-2.419	1.491	2.842	-2.245	1.360	2.625	-1.630	1.140	1.989

Table B.60: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.088	0.178	0.198	0.050	0.141	0.150	0.009	0.032	0.033
Flat-top taper	-0.457	0.767	0.893	0.062	0.250	0.258	-0.016	0.096	0.097
Local ($\widehat{\delta}_*$)	0.033	0.138	0.142	0.003	0.051	0.051	-0.009	0.039	0.040

Table B.61: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.786	7.602	8.096	-1.401	4.760	4.962	-0.828	2.548	2.679
Flat-top taper	-1.622	9.467	9.605	-0.579	5.501	5.531	-0.292	2.722	2.737
Local ($\widehat{\delta}_*$)	-3.636	6.726	7.646	-1.803	4.415	4.769	-0.936	2.426	2.600

Table B.62: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.020	0.160	0.162	0.034	0.133	0.137	0.011	0.057	0.058
Flat-top taper	-0.345	0.477	0.589	0.017	0.195	0.195	-0.011	0.071	0.072
Local ($\widehat{\delta}_*$)	0.020	0.159	0.160	0.000	0.071	0.071	-0.007	0.041	0.041

Table B.63: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.735	4.599	4.915	-0.898	2.797	2.938	-0.498	1.490	1.571
Flat-top taper	-1.073	5.703	5.803	-0.457	3.188	3.220	-0.200	1.581	1.594
Local ($\widehat{\delta}_*$)	-2.223	4.128	4.689	-1.172	2.544	2.801	-0.576	1.420	1.532

Table B.64: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.006	0.357	0.357	0.002	0.166	0.166	0.022	0.106	0.109
Flat-top taper	-0.201	0.454	0.496	-0.087	0.219	0.236	0.004	0.086	0.086
Local ($\widehat{\delta}_*$)	0.004	0.313	0.314	-0.006	0.146	0.146	-0.016	0.066	0.068

Table B.65: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.069	2.269	2.508	-0.575	1.288	1.410	-0.304	0.710	0.772
Flat-top taper	-0.833	2.734	2.858	-0.463	1.437	1.509	-0.209	0.745	0.774
Local ($\widehat{\delta}_*$)	-1.227	1.986	2.334	-0.762	1.238	1.453	-0.366	0.679	0.771

Table B.66: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.092	0.343	0.355	0.106	0.190	0.218	0.057	0.124	0.136
Flat-top taper	0.085	0.360	0.370	0.098	0.207	0.229	0.033	0.155	0.158
Local ($\widehat{\delta}_*$)	-0.038	0.357	0.359	-0.040	0.179	0.183	-0.032	0.085	0.091

Table B.67: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.394	0.450	0.599	-0.377	0.266	0.461	-0.291	0.211	0.359
Flat-top taper	-0.386	0.492	0.625	-0.374	0.274	0.464	-0.300	0.203	0.362
Local ($\widehat{\delta}_*$)	-0.257	0.515	0.576	-0.263	0.256	0.367	-0.248	0.151	0.290

Table B.68: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.328	0.467	0.571	-0.132	0.358	0.382	-0.027	0.183	0.185
Flat-top taper	-0.325	0.502	0.598	-0.059	0.426	0.430	0.043	0.228	0.233
Local ($\widehat{\delta}_*$)	0.058	0.589	0.592	0.062	0.327	0.332	-0.001	0.176	0.176

Table B.69: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.822	0.433	0.929	0.520	0.381	0.645	0.156	0.105	0.188
Flat-top taper	0.809	0.458	0.929	0.577	0.350	0.675	0.314	0.174	0.359
Local ($\widehat{\delta}_*$)	0.551	0.357	0.657	0.441	0.268	0.516	0.227	0.174	0.286

Table B.70: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.214	0.457	0.505	0.019	0.028	0.034	0.006	0.013	0.014
Flat-top taper	0.136	0.539	0.556	0.005	0.157	0.157	0.001	0.080	0.080
Local ($\widehat{\delta}_*$)	0.141	0.317	0.347	0.008	0.048	0.048	0.002	0.017	0.017

Table B.71: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.435	1.455	1.518	-0.215	0.762	0.792	-0.141	0.402	0.425
Flat-top taper	-0.115	1.680	1.684	0.012	0.777	0.777	0.000	0.360	0.360
Local ($\widehat{\delta}_*$)	-0.344	1.325	1.369	-0.186	0.678	0.703	-0.106	0.347	0.363

Table B.72: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.371	0.488	0.613	0.025	0.133	0.135	0.014	0.060	0.062
Flat-top taper	0.317	0.538	0.624	0.000	0.149	0.149	0.000	0.067	0.067
Local ($\widehat{\delta}_*$)	0.193	0.334	0.385	0.023	0.134	0.136	0.007	0.061	0.062

Table B.73: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.424	0.824	0.927	-0.130	0.448	0.467	-0.081	0.233	0.247
Flat-top taper	-0.334	0.950	1.007	0.000	0.458	0.458	0.001	0.212	0.212
Local ($\widehat{\delta}_*$)	-0.185	0.737	0.760	-0.113	0.401	0.417	-0.063	0.205	0.215

Table B.74: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.028	0.333	0.334	-0.009	0.166	0.166	-0.001	0.081	0.081
Flat-top taper	-0.029	0.338	0.340	-0.009	0.168	0.169	-0.001	0.081	0.081
Local ($\widehat{\delta}_*$)	-0.004	0.404	0.405	-0.003	0.199	0.199	0.000	0.098	0.098

Table B.75: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.020	0.332	0.332	-0.007	0.166	0.167	-0.001	0.081	0.081
Flat-top taper	-0.020	0.343	0.344	-0.007	0.169	0.169	-0.001	0.081	0.081
Local ($\widehat{\delta}_*$)	-0.004	0.400	0.400	-0.002	0.199	0.199	0.001	0.098	0.098

Table B.76: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.564	0.753	0.940	-0.158	0.454	0.481	-0.079	0.241	0.254
Flat-top taper	-0.520	0.826	0.976	-0.046	0.447	0.449	-0.010	0.206	0.206
Local ($\widehat{\delta}_*$)	-0.232	0.698	0.735	-0.125	0.392	0.411	-0.066	0.201	0.211

Table B.77: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.455	0.459	0.646	0.059	0.138	0.150	0.026	0.058	0.064
Flat-top taper	0.399	0.516	0.652	0.021	0.157	0.158	0.004	0.067	0.067
Local ($\widehat{\delta}_*$)	0.169	0.294	0.340	0.027	0.135	0.138	0.009	0.061	0.062

Table B.78: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.689	1.316	1.486	-0.279	0.771	0.820	-0.142	0.429	0.452
Flat-top taper	-0.456	1.452	1.522	-0.082	0.743	0.748	-0.020	0.369	0.369
Local ($\widehat{\delta}_*$)	-0.451	1.159	1.244	-0.221	0.659	0.695	-0.113	0.357	0.375

Table B.79: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.286	0.504	0.580	0.030	0.031	0.043	0.010	0.013	0.017
Flat-top taper	0.225	0.571	0.614	0.021	0.155	0.157	0.006	0.080	0.080
Local ($\widehat{\delta}_*$)	0.148	0.293	0.328	0.008	0.044	0.045	0.002	0.017	0.017

Table B.80: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.819	0.467	0.943	0.480	0.397	0.623	0.128	0.091	0.157
Flat-top taper	0.810	0.485	0.944	0.564	0.351	0.664	0.318	0.174	0.363
Local ($\widehat{\delta}_*$)	0.623	0.398	0.740	0.453	0.275	0.530	0.237	0.174	0.294

Table B.81: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.238	0.530	0.581	-0.105	0.360	0.375	-0.020	0.178	0.179
Flat-top taper	-0.220	0.602	0.641	-0.023	0.438	0.439	0.056	0.229	0.236
Local ($\widehat{\delta}_*$)	0.078	0.613	0.618	0.062	0.334	0.340	-0.001	0.177	0.177

Table B.82: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.432	0.372	0.570	-0.392	0.244	0.462	-0.292	0.215	0.363
Flat-top taper	-0.431	0.382	0.576	-0.393	0.242	0.461	-0.314	0.198	0.371
Local ($\widehat{\delta}_*$)	-0.291	0.461	0.545	-0.276	0.245	0.369	-0.254	0.149	0.295

Table B.83: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.108	0.340	0.357	0.115	0.181	0.215	0.071	0.120	0.140
Flat-top taper	0.105	0.355	0.370	0.108	0.197	0.225	0.045	0.151	0.158
Local ($\widehat{\delta}_*$)	-0.029	0.364	0.365	-0.036	0.175	0.179	-0.029	0.086	0.091

Table B.84: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.558	1.577	2.217	-0.709	1.169	1.367	-0.319	0.699	0.768
Flat-top taper	-1.518	1.676	2.261	-0.708	1.249	1.436	-0.288	0.702	0.759
Local ($\widehat{\delta}_*$)	-1.618	1.352	2.108	-0.904	1.110	1.431	-0.409	0.651	0.768

Table B.85: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.137	0.377	0.401	0.036	0.175	0.178	0.040	0.120	0.126
Flat-top taper	-0.098	0.491	0.500	-0.081	0.222	0.237	0.012	0.085	0.086
Local ($\widehat{\delta}_*$)	0.003	0.297	0.297	-0.005	0.145	0.145	-0.014	0.066	0.067

Table B.86: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.837	3.275	4.333	-1.233	2.569	2.850	-0.558	1.490	1.591
Flat-top taper	-2.651	3.627	4.492	-0.985	2.778	2.948	-0.362	1.520	1.562
Local ($\widehat{\delta}_*$)	-3.114	3.044	4.354	-1.435	2.388	2.786	-0.651	1.392	1.537

Table B.87: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.067	0.193	0.204	0.063	0.176	0.187	0.021	0.075	0.078
Flat-top taper	-0.348	0.460	0.577	0.018	0.210	0.211	-0.007	0.072	0.072
Local ($\widehat{\delta}_*$)	0.024	0.152	0.154	0.001	0.067	0.067	-0.005	0.038	0.039

Table B.88: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-4.549	5.717	7.306	-1.945	4.350	4.765	-0.933	2.501	2.669
Flat-top taper	-4.182	6.397	7.642	-1.464	4.759	4.979	-0.563	2.563	2.624
Local ($\widehat{\delta}_*$)	-4.931	5.354	7.278	-2.230	4.079	4.649	-1.064	2.342	2.573

Table B.89: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.104	0.189	0.216	0.070	0.209	0.220	0.014	0.055	0.057
Flat-top taper	-0.504	0.727	0.885	0.064	0.268	0.275	-0.014	0.099	0.100
Local ($\widehat{\delta}_*$)	0.036	0.124	0.129	0.005	0.046	0.046	-0.008	0.037	0.038

Table B.90: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.946	0.590	3.005	-2.505	1.166	2.763	-1.476	1.229	1.921
Flat-top taper	-2.942	0.621	3.007	-2.532	1.160	2.785	-1.662	1.193	2.046
Local ($\widehat{\delta}_*$)	-2.833	0.594	2.895	-2.499	0.965	2.679	-1.748	1.075	2.052

Table B.91: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.063	0.338	0.344	0.074	0.213	0.226	0.006	0.155	0.155
Flat-top taper	0.060	0.359	0.364	0.066	0.245	0.254	-0.003	0.186	0.186
Local ($\widehat{\delta}_*$)	-0.091	0.359	0.371	-0.089	0.197	0.216	-0.026	0.131	0.134

Table B.92: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-27.216	9.305	28.763	-13.928	14.708	20.256	-5.956	12.507	13.853
Flat-top taper	-26.151	11.223	28.457	-10.953	17.716	20.829	-3.164	14.132	14.481
Local ($\widehat{\delta}_*$)	-27.472	9.624	29.109	-14.197	14.990	20.645	-6.194	12.287	13.760

Table B.93: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.037	0.359	0.361	-0.005	0.248	0.248	-0.004	0.169	0.169
Flat-top taper	-0.028	0.454	0.455	0.004	0.294	0.294	0.001	0.196	0.196
Local ($\widehat{\delta}_*$)	-0.037	0.325	0.327	-0.027	0.194	0.195	-0.027	0.119	0.123

Table B.94: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-75.296	24.887	79.302	-39.358	40.196	56.256	-16.877	36.046	39.801
Flat-top taper	-71.310	30.329	77.491	-29.897	49.234	57.601	-8.251	41.397	42.211
Local ($\widehat{\delta}_*$)	-75.456	25.771	79.735	-39.140	41.225	56.846	-16.744	35.776	39.500

Table B.95: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.077	0.288	0.298	0.015	0.156	0.156	0.002	0.089	0.089
Flat-top taper	0.026	0.358	0.359	0.026	0.177	0.179	0.007	0.106	0.106
Local ($\widehat{\delta}_*$)	0.041	0.241	0.244	-0.003	0.113	0.113	-0.014	0.069	0.070

Table B.96: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-147.190	48.675	155.029	-75.064	81.054	110.474	-31.876	70.403	77.283
Flat-top taper	-138.848	59.480	151.052	-55.692	99.482	114.010	-14.223	80.774	82.016
Local ($\widehat{\delta}_*$)	-146.986	51.144	155.630	-74.276	83.898	112.052	-31.293	68.517	75.325

Table B.97: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.138	0.340	0.367	0.028	0.092	0.096	0.006	0.040	0.041
Flat-top taper	0.095	0.456	0.465	0.054	0.144	0.154	0.017	0.060	0.063
Local ($\widehat{\delta}_*$)	0.085	0.226	0.241	0.011	0.077	0.077	-0.002	0.035	0.035

Table B.98: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-243.945	79.588	256.600	-125.016	133.438	182.851	-53.910	118.121	129.842
Flat-top taper	-230.194	97.085	249.830	-92.829	163.639	188.135	-25.325	134.785	137.144
Local ($\widehat{\delta}_*$)	-243.457	83.363	257.333	-123.716	137.017	184.606	-53.143	116.539	128.084

Table B.99: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.228	0.774	0.807	0.047	0.125	0.133	0.011	0.016	0.019
Flat-top taper	0.162	0.710	0.729	0.092	0.205	0.224	0.027	0.075	0.080
Local ($\widehat{\delta}_*$)	0.141	0.311	0.342	0.019	0.100	0.102	-0.002	0.035	0.035

Table B.100: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

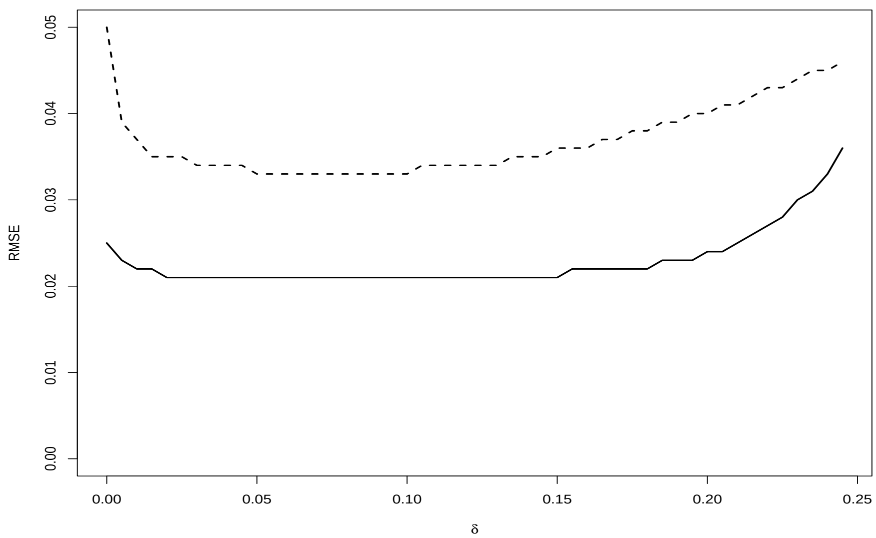

Figure B.51: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$.

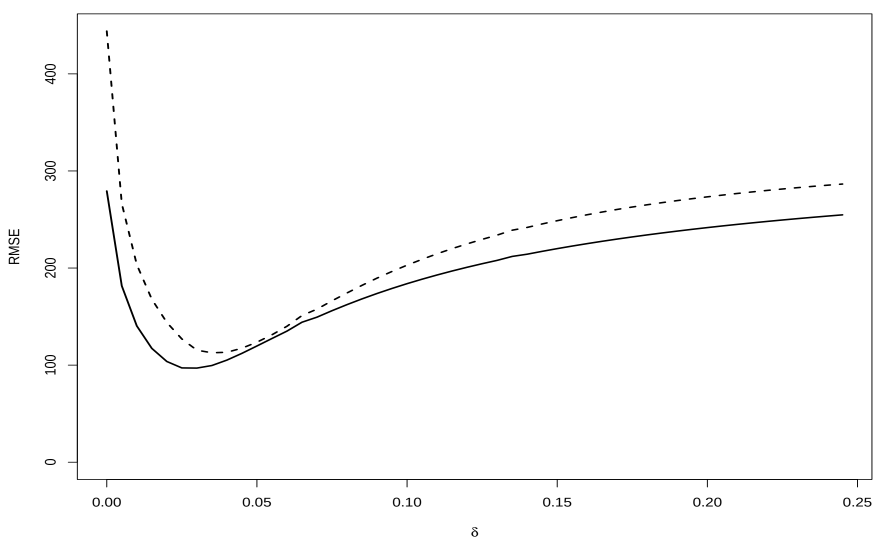

Figure B.52: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$.

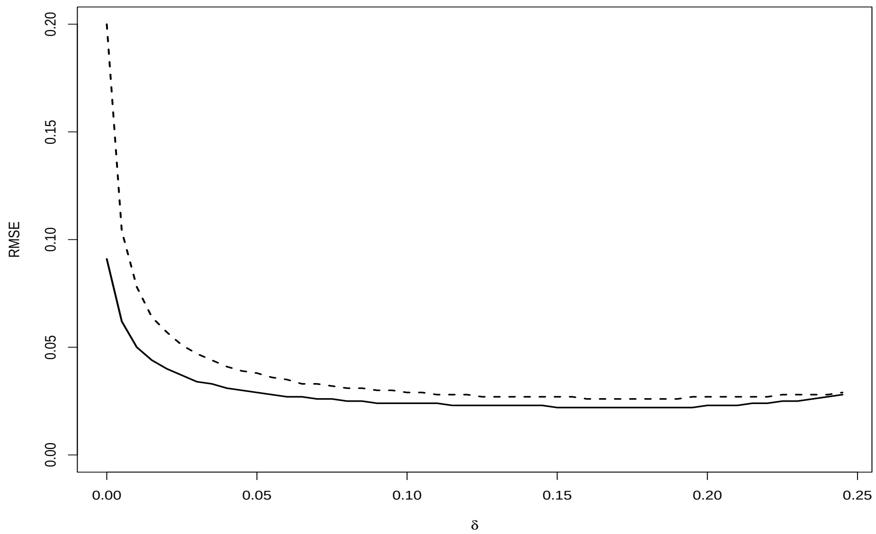

Figure B.53: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$.

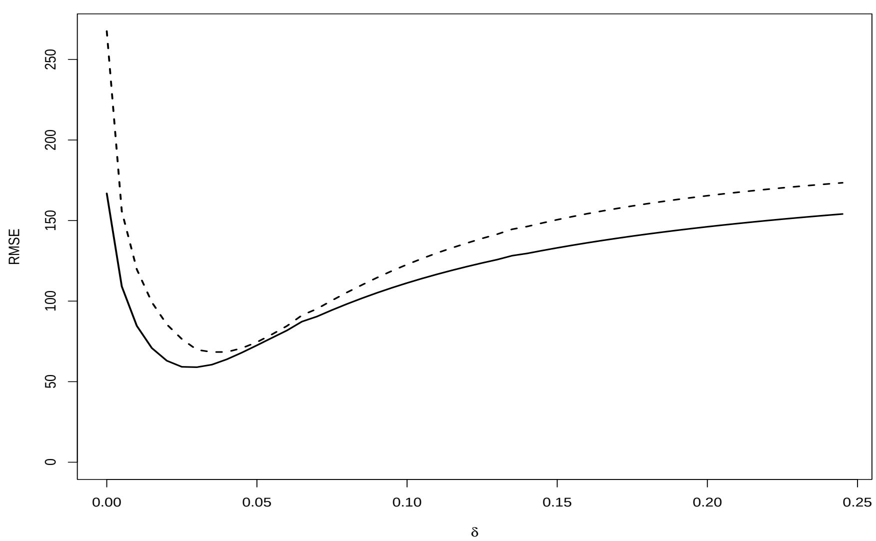

Figure B.54: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$.

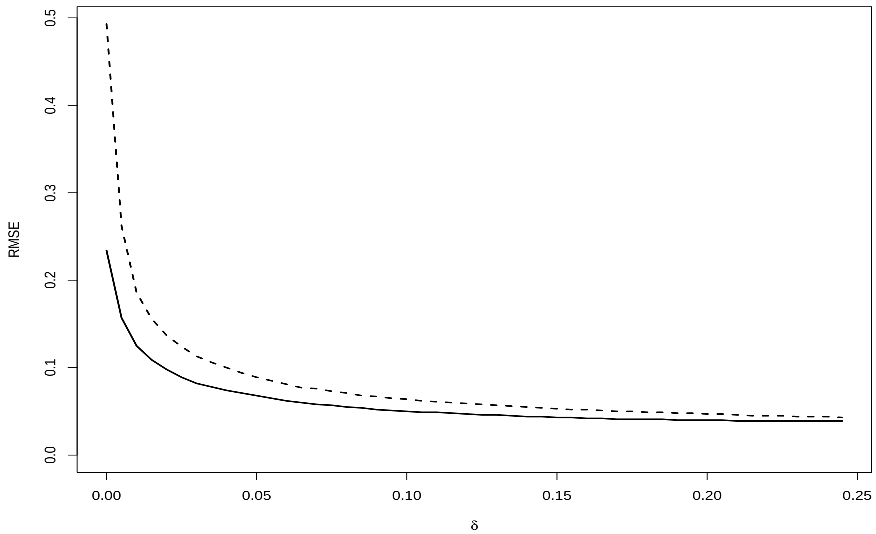

Figure B.55: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$.

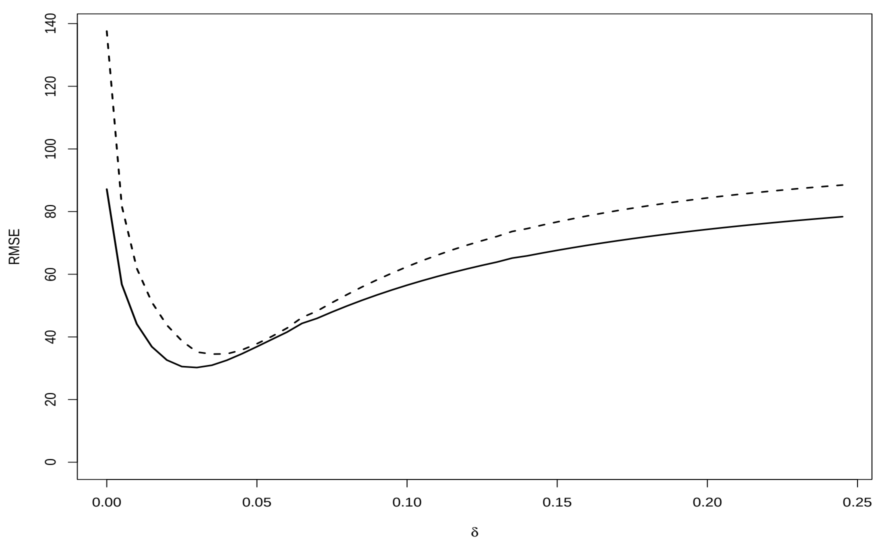

Figure B.56: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$.

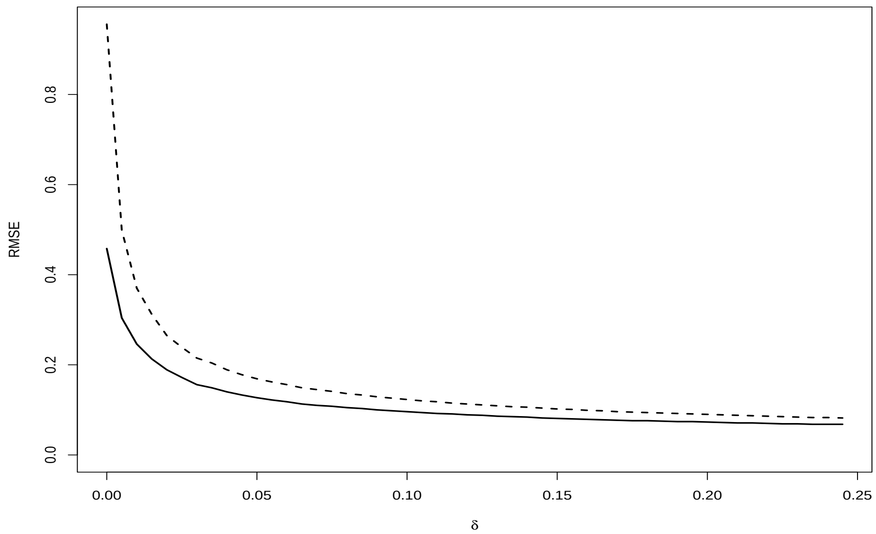

Figure B.57: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$.

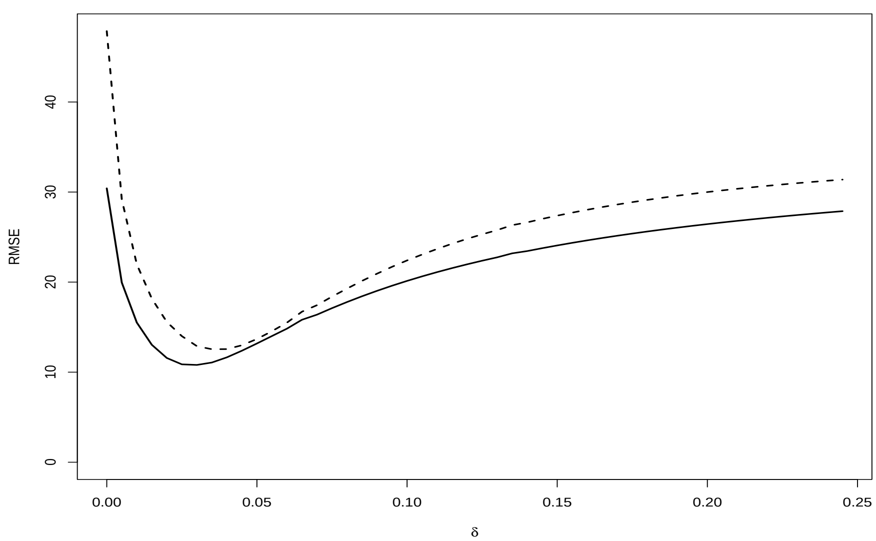

Figure B.58: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$.

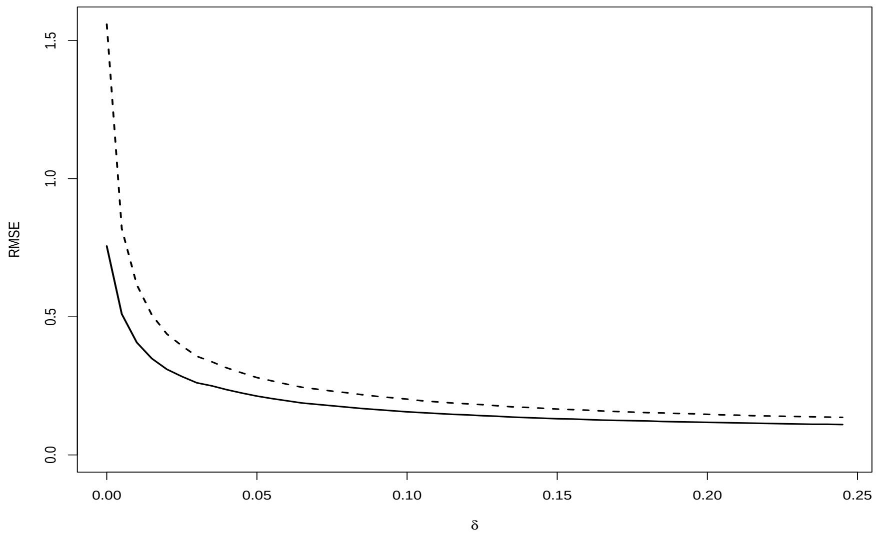

Figure B.59: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$.

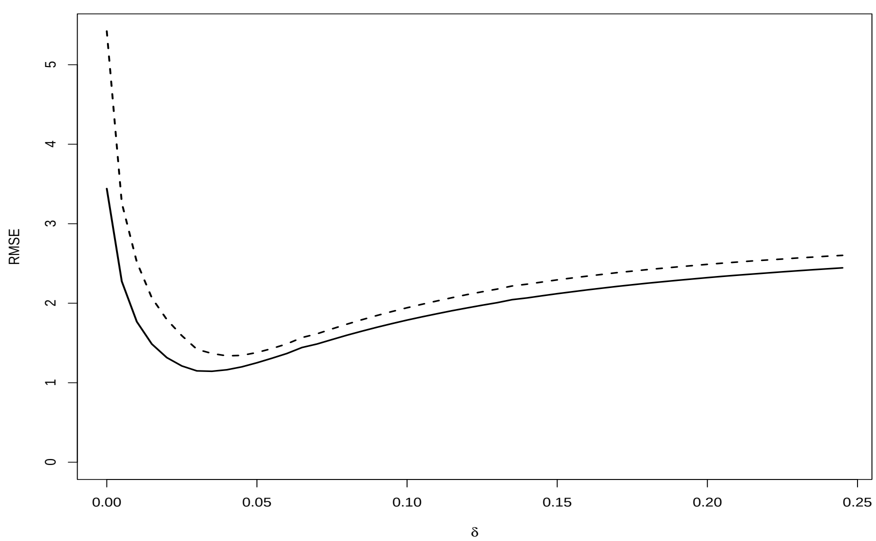

Figure B.60: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$.

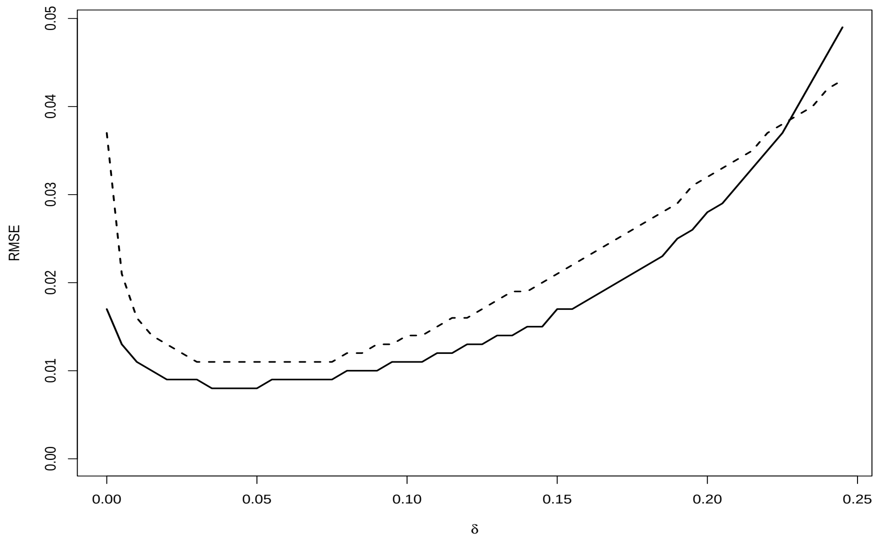

Figure B.61: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$.

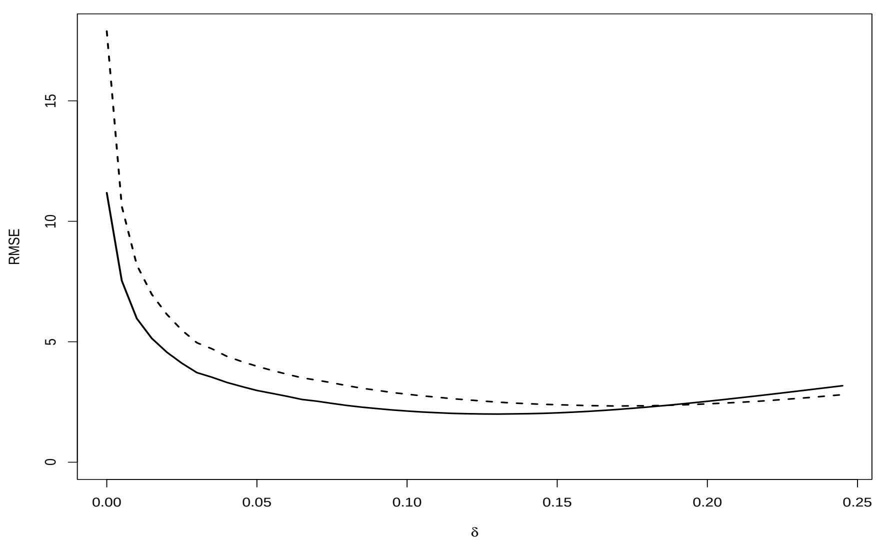

Figure B.62: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$.

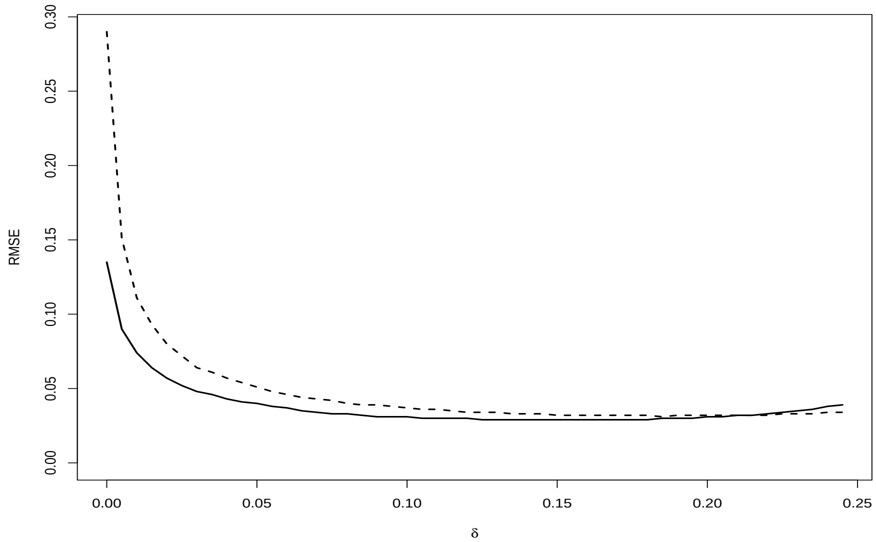

Figure B.63: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$.

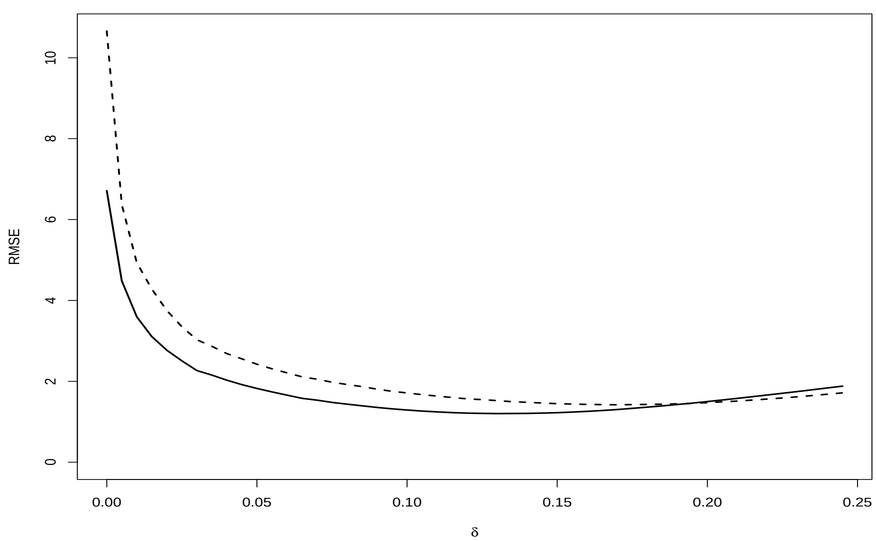

Figure B.64: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$.

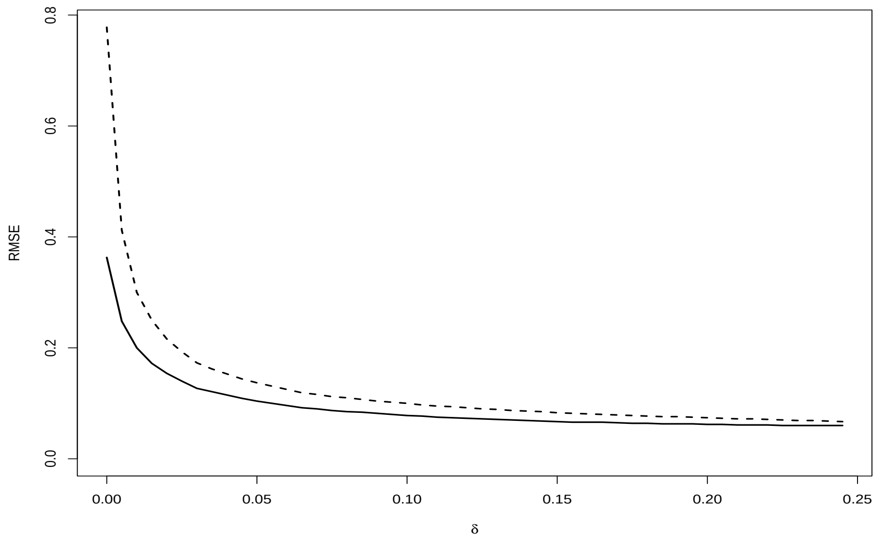

Figure B.65: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$.

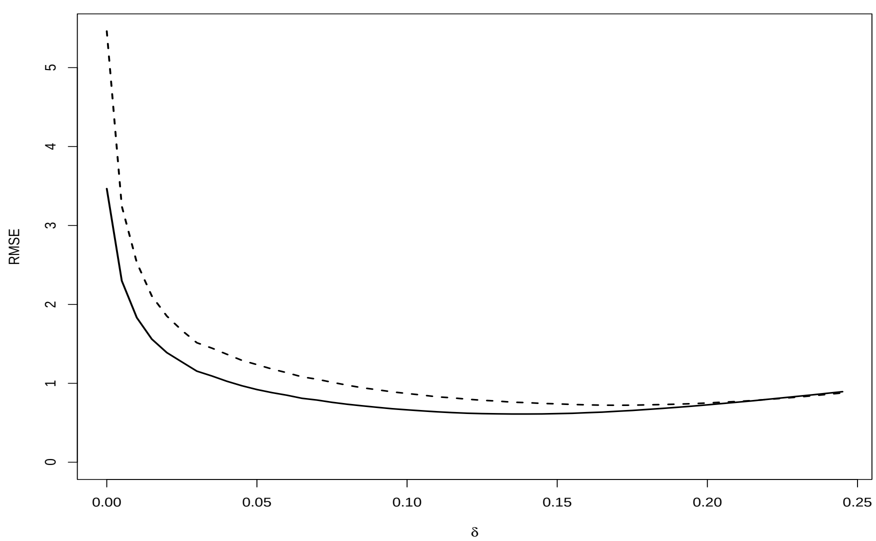

Figure B.66: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$.

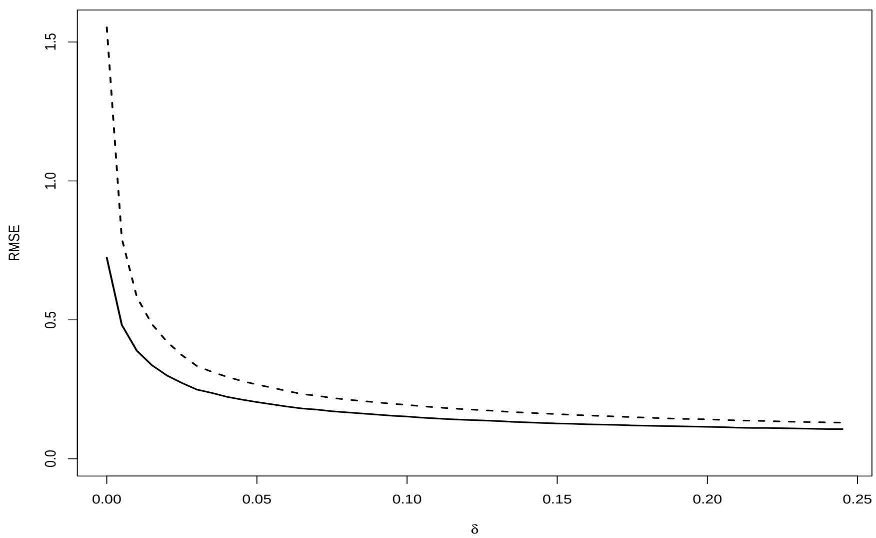

Figure B.67: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$.

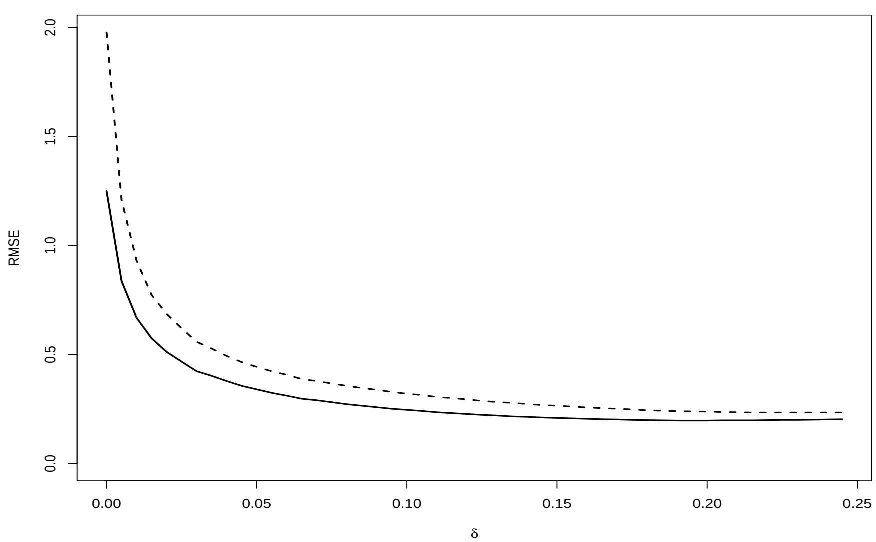

Figure B.68: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$.

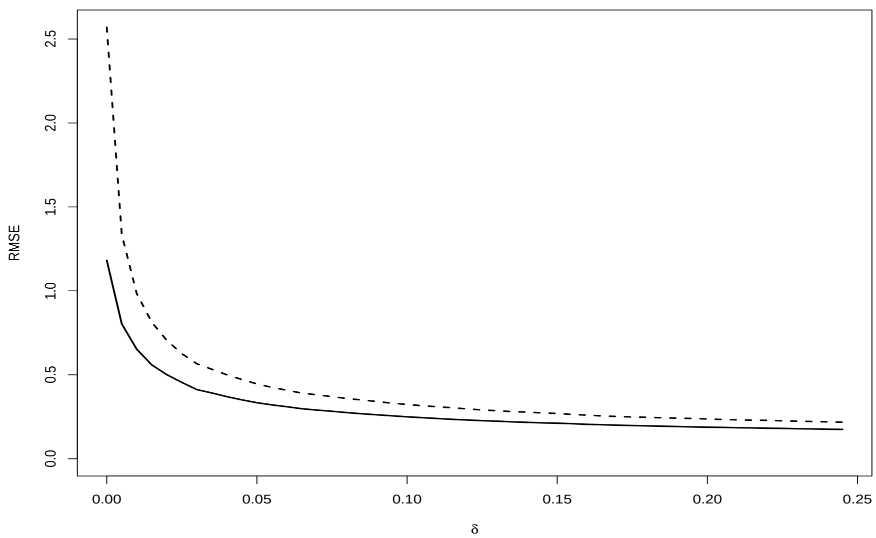

Figure B.69: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$.

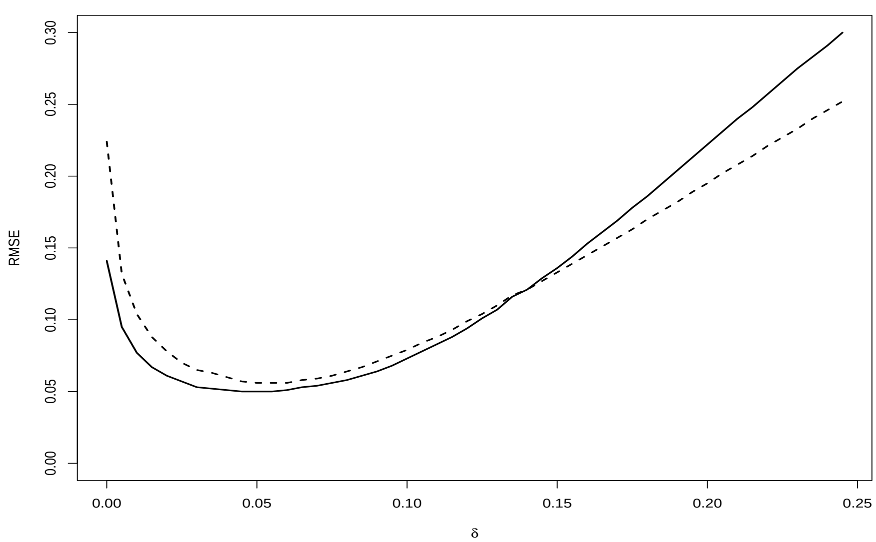

Figure B.70: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$.

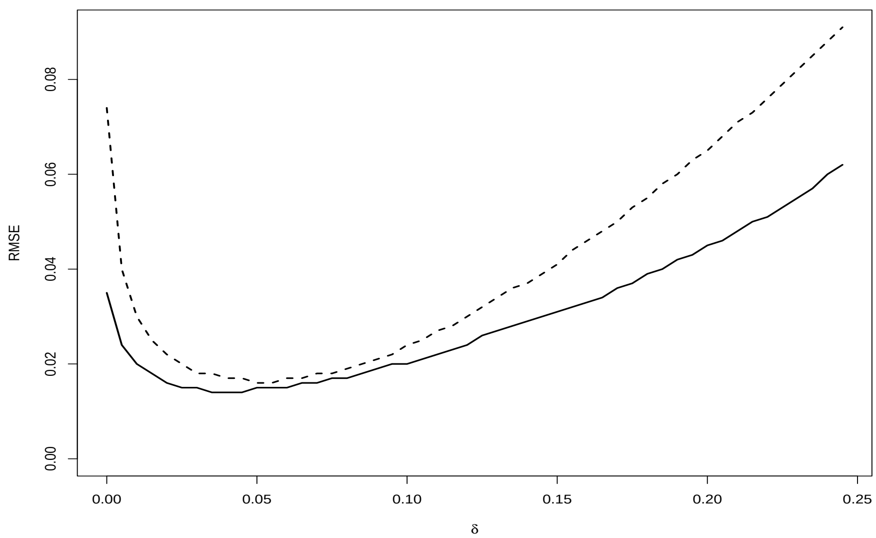

Figure B.71: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$.

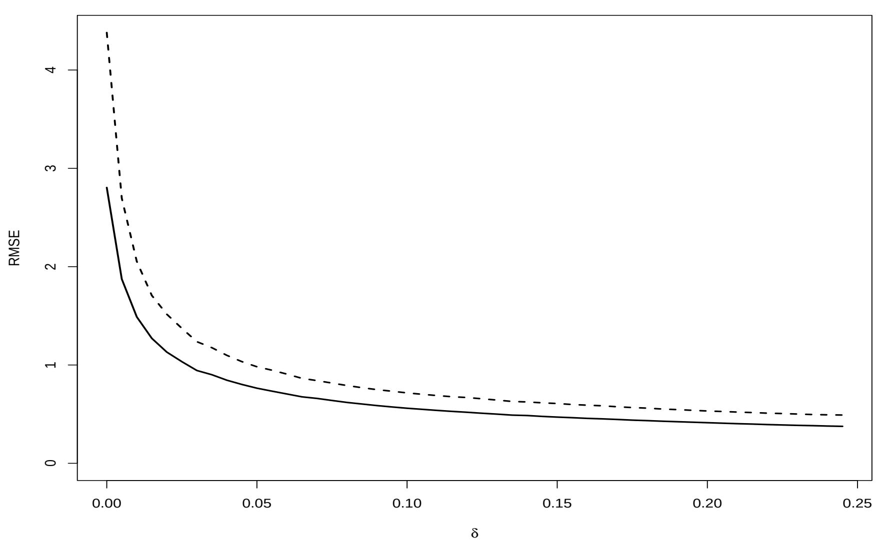

Figure B.72: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$.

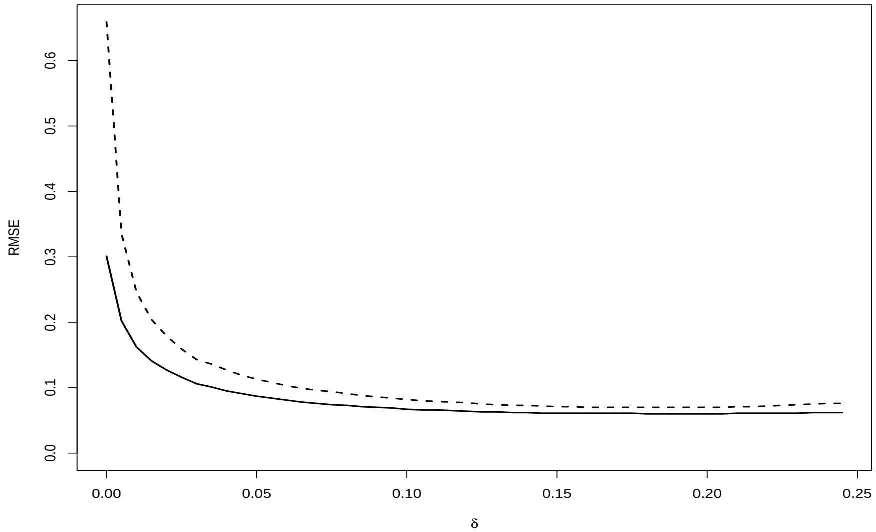

Figure B.73: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$.

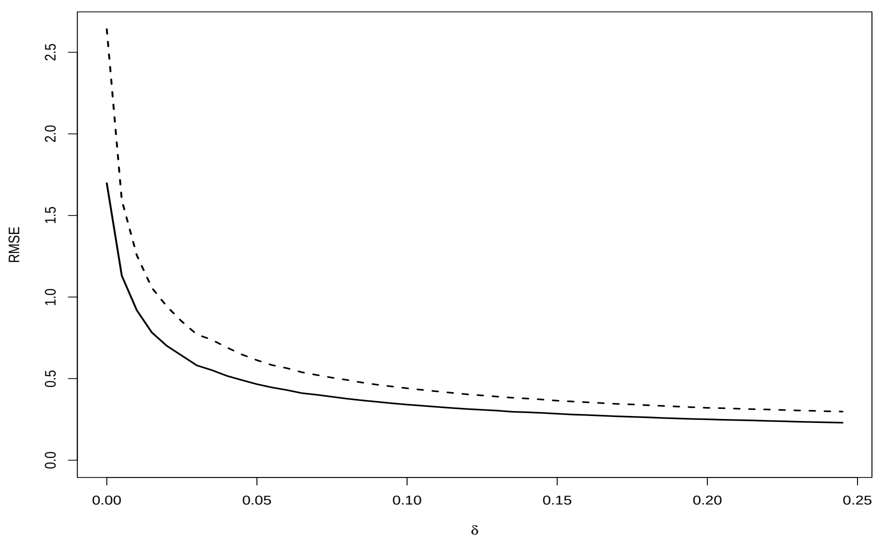

Figure B.74: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$.

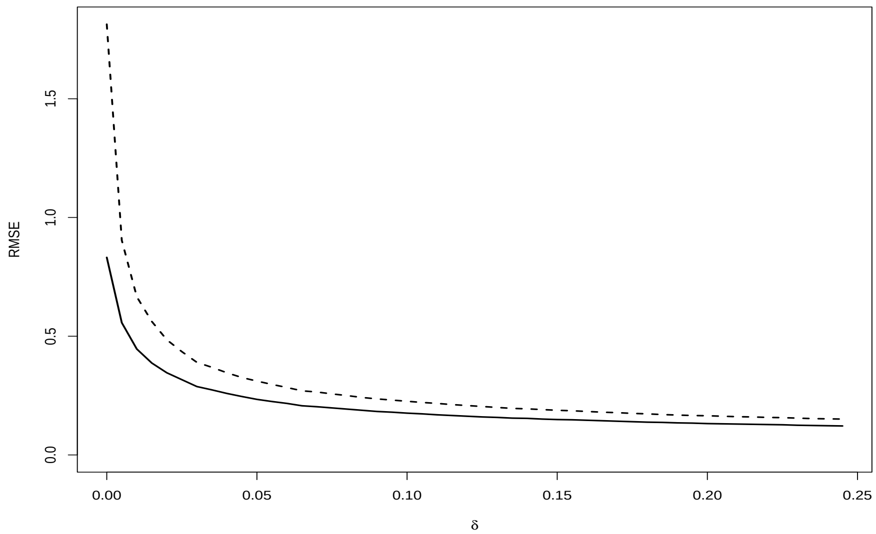

Figure B.75: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$.

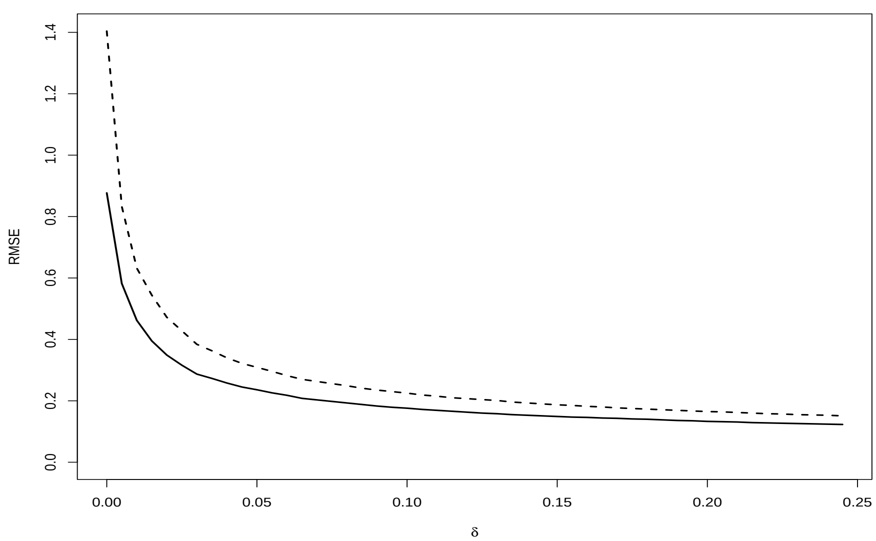

Figure B.76: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$.

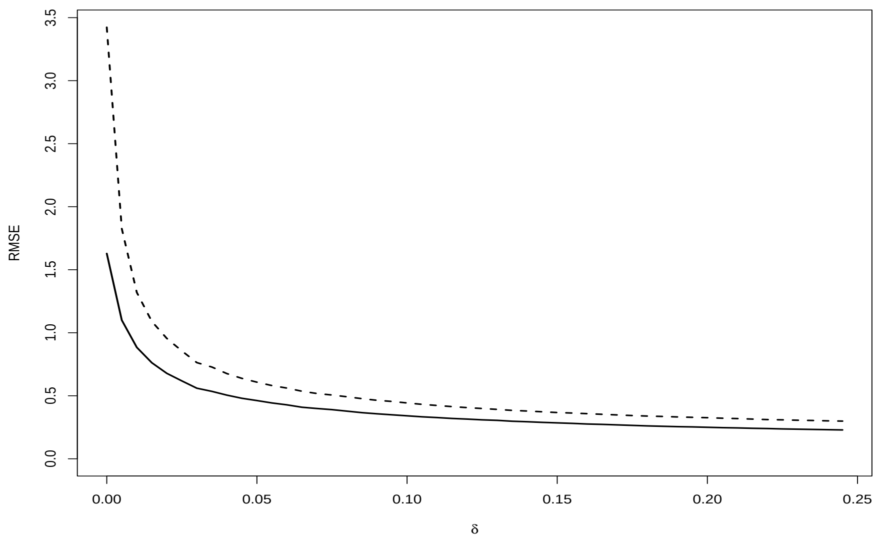

Figure B.77: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$.

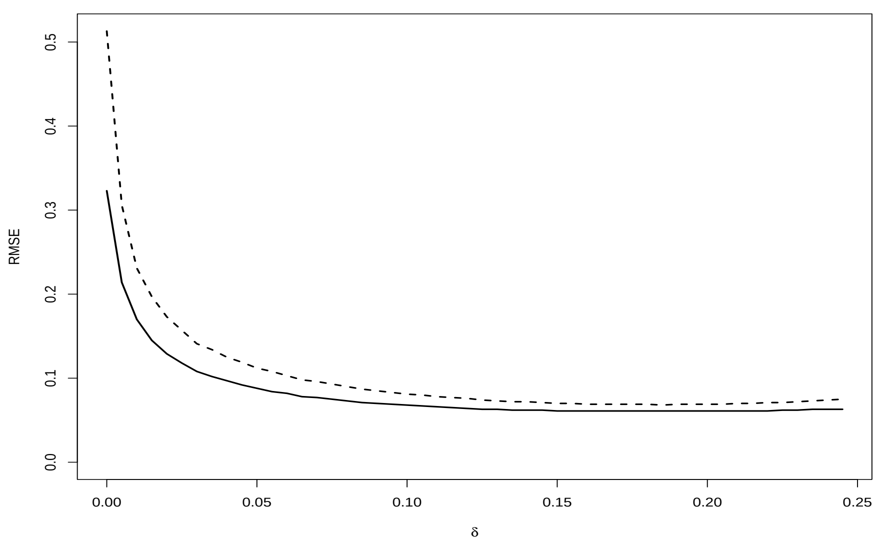

Figure B.78: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$.

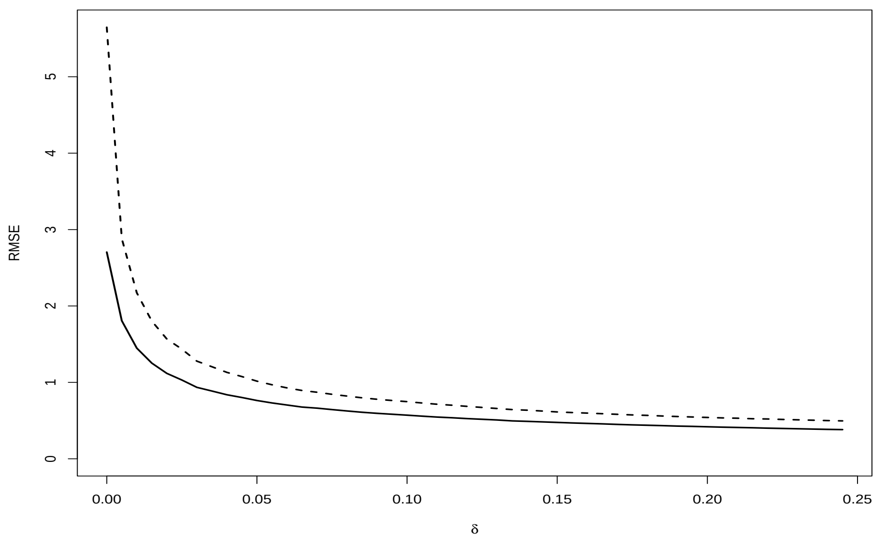

Figure B.79: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$.

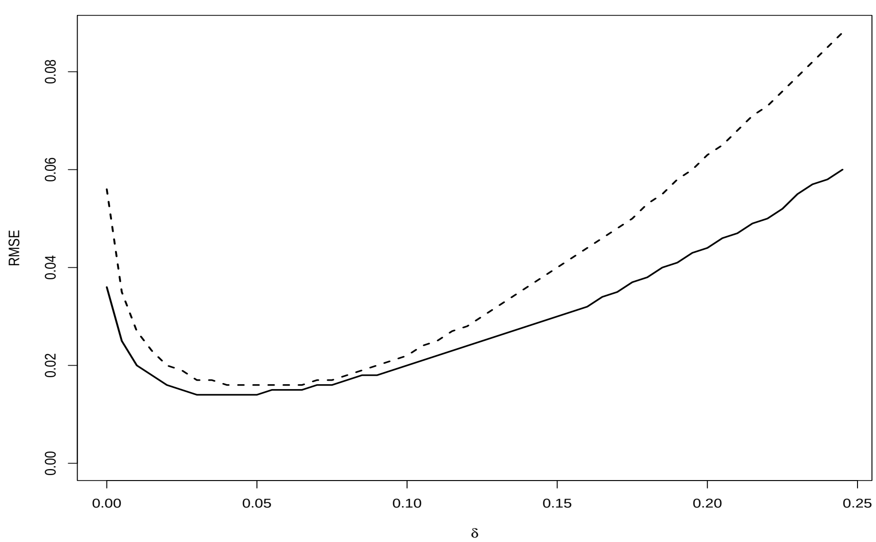

Figure B.80: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$.

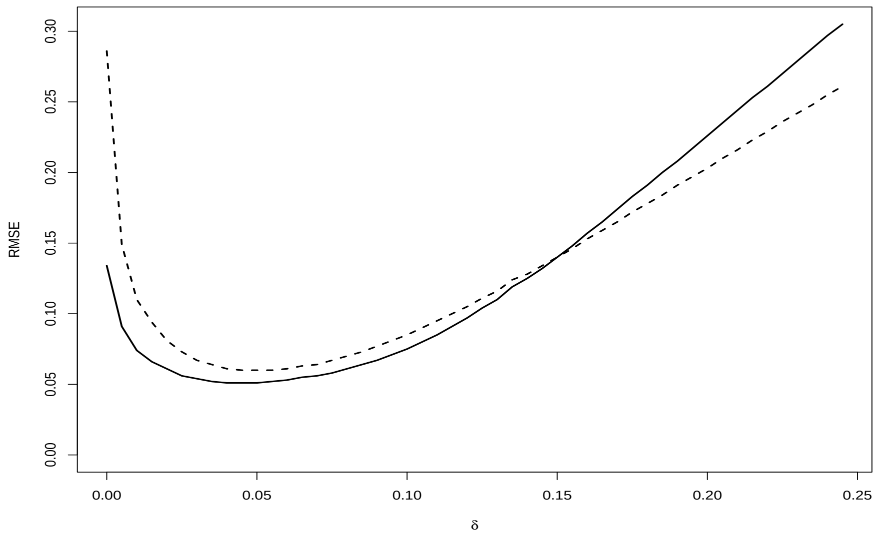

Figure B.81: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$.

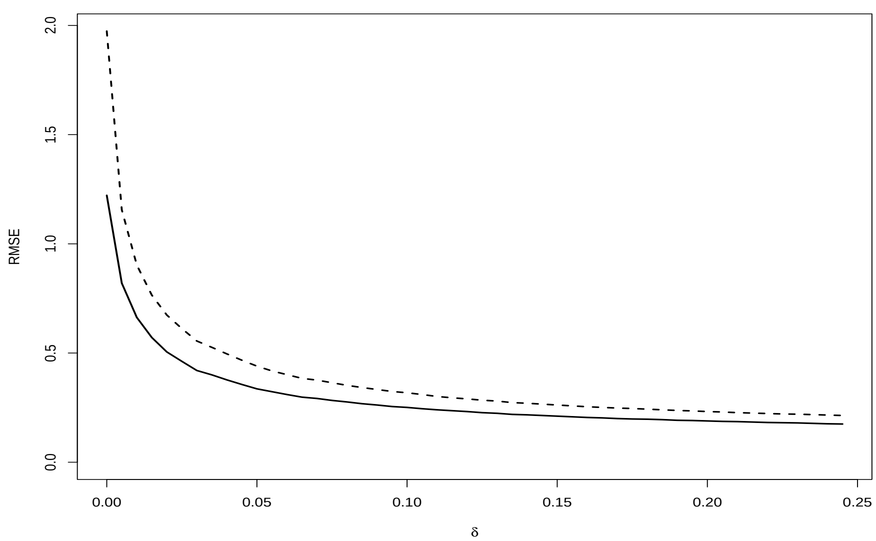

Figure B.82: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$.

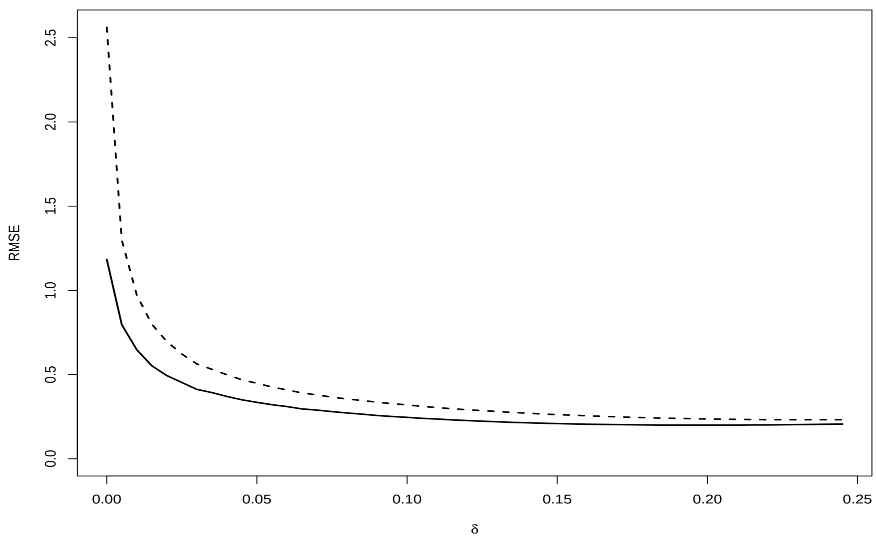

Figure B.83: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$.

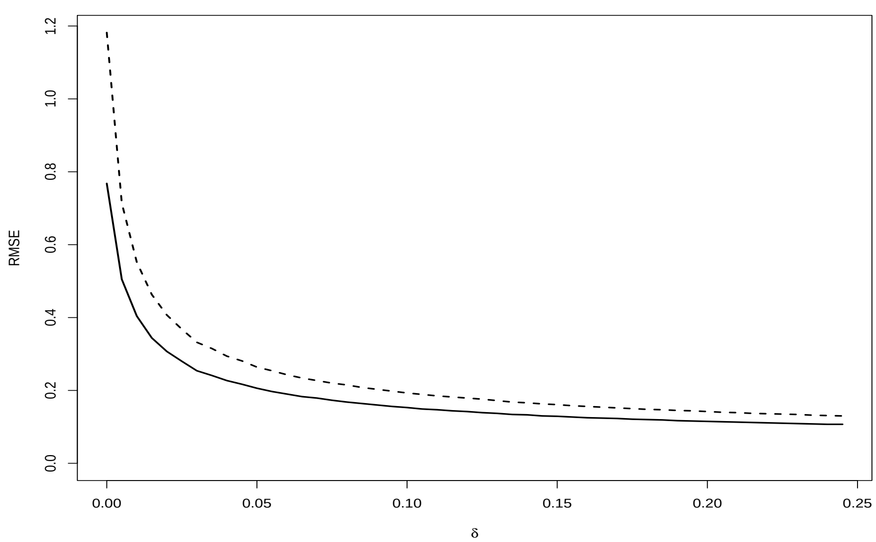

Figure B.84: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$.

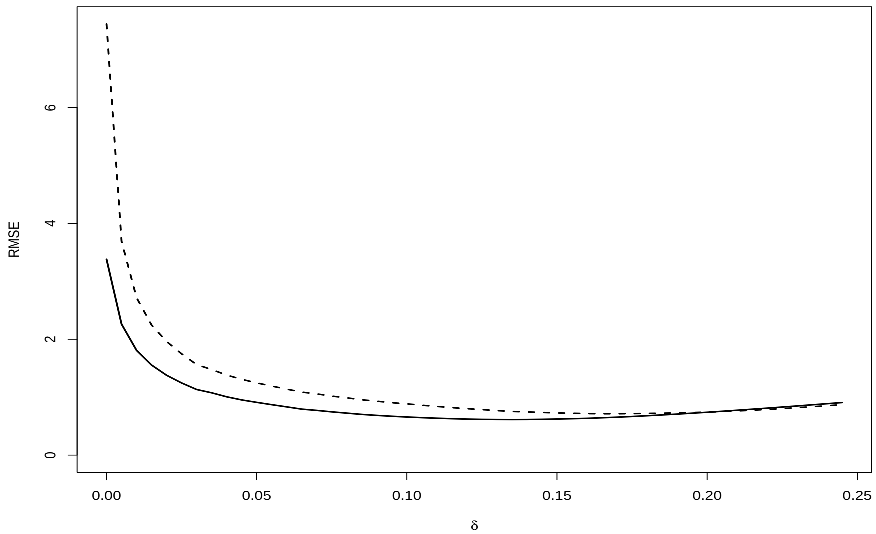

Figure B.85: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$.

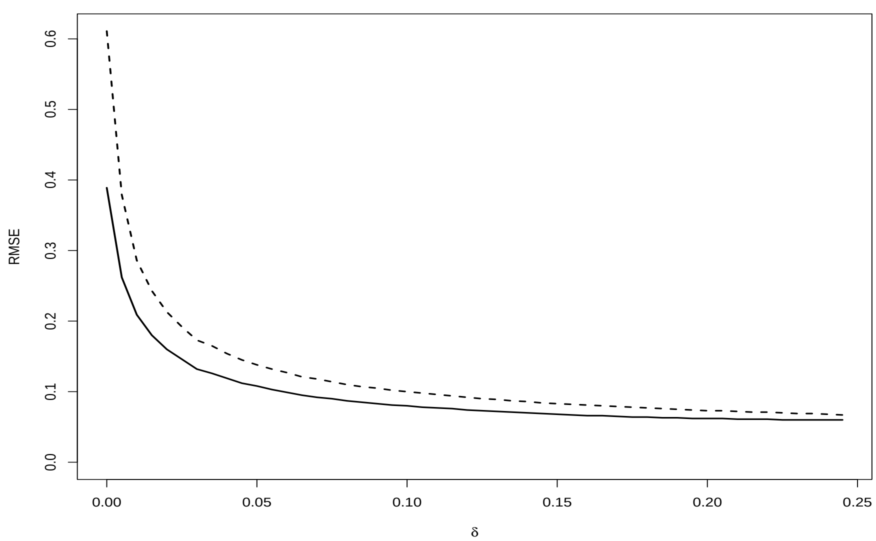

Figure B.86: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$.

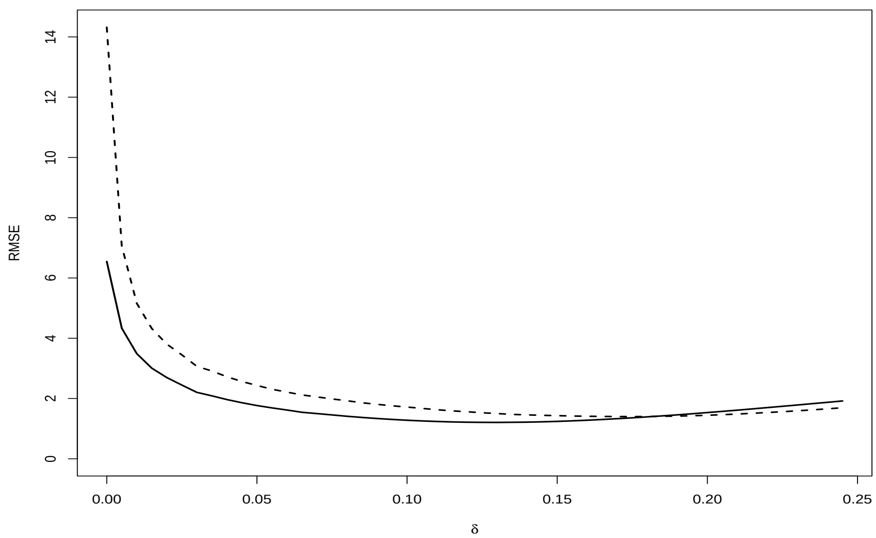

Figure B.87: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$.

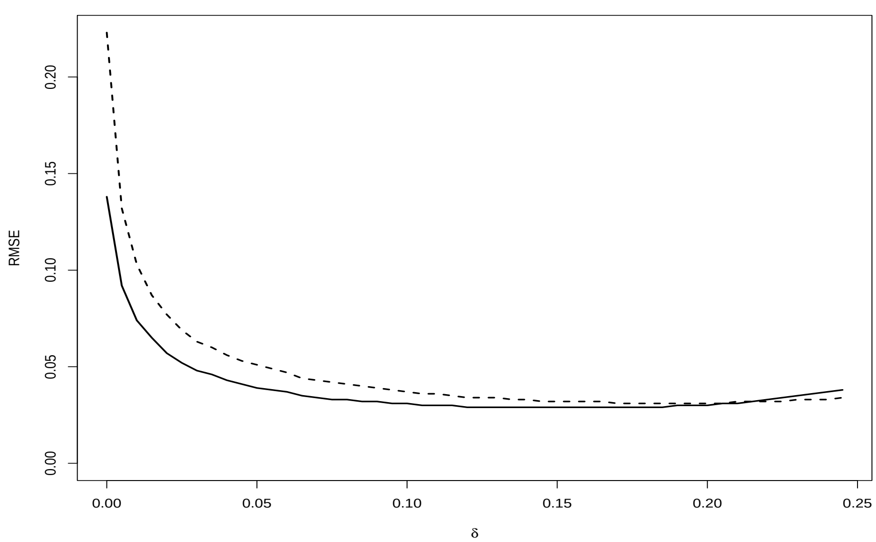

Figure B.88: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$.

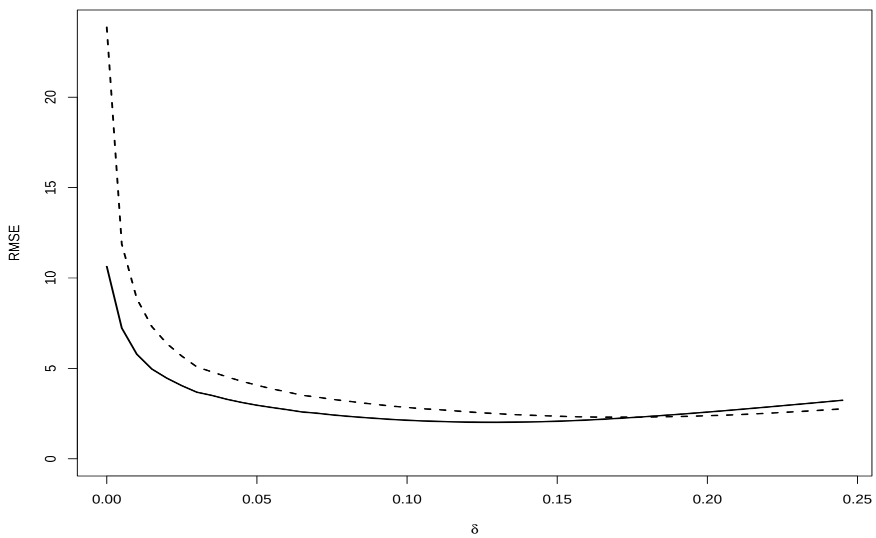

Figure B.89: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$.

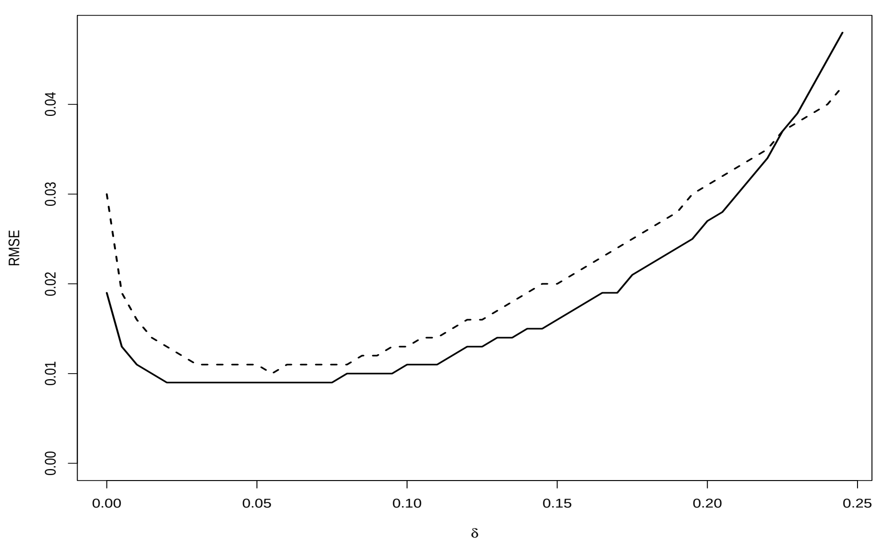

Figure B.90: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$.

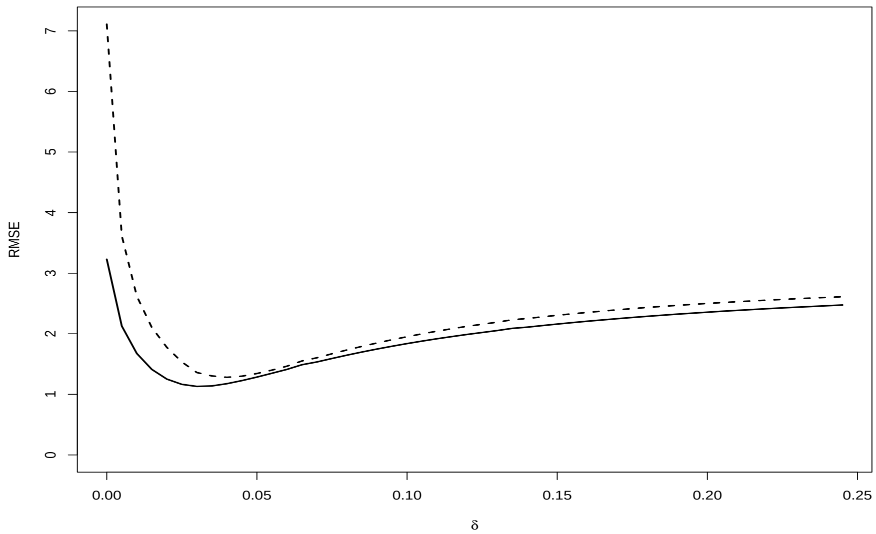

Figure B.91: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$.

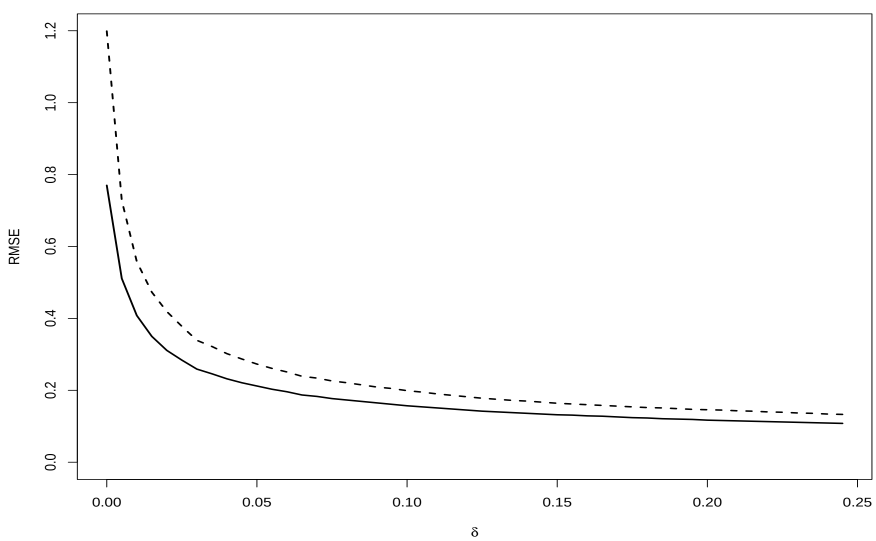

Figure B.92: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$.

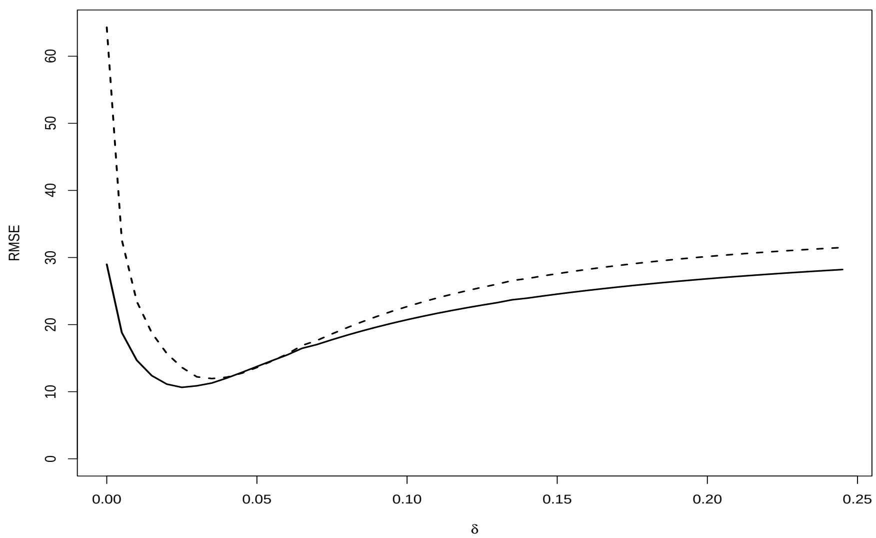

Figure B.93: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$.

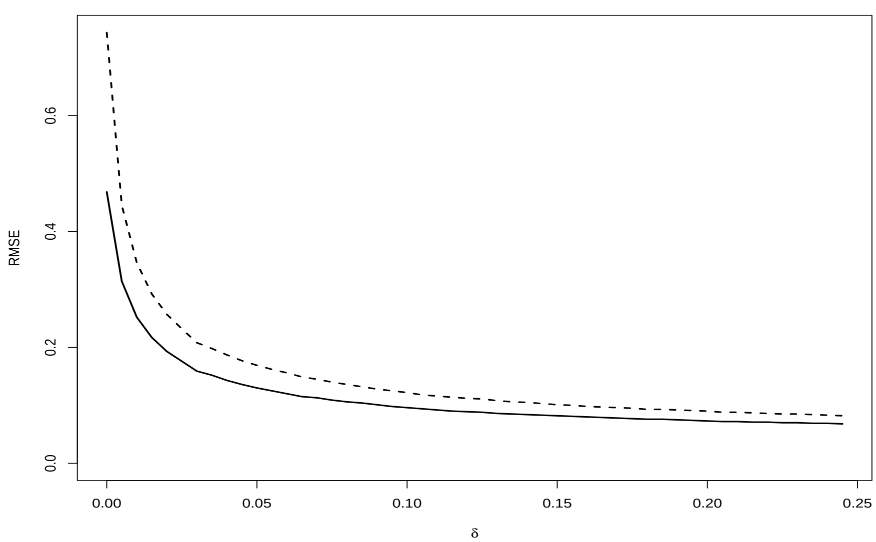

Figure B.94: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$.

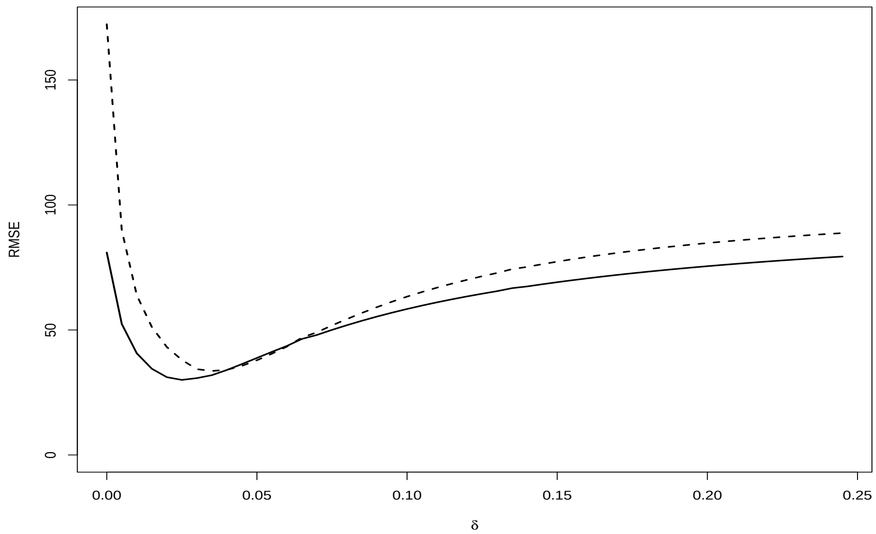

Figure B.95: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$.

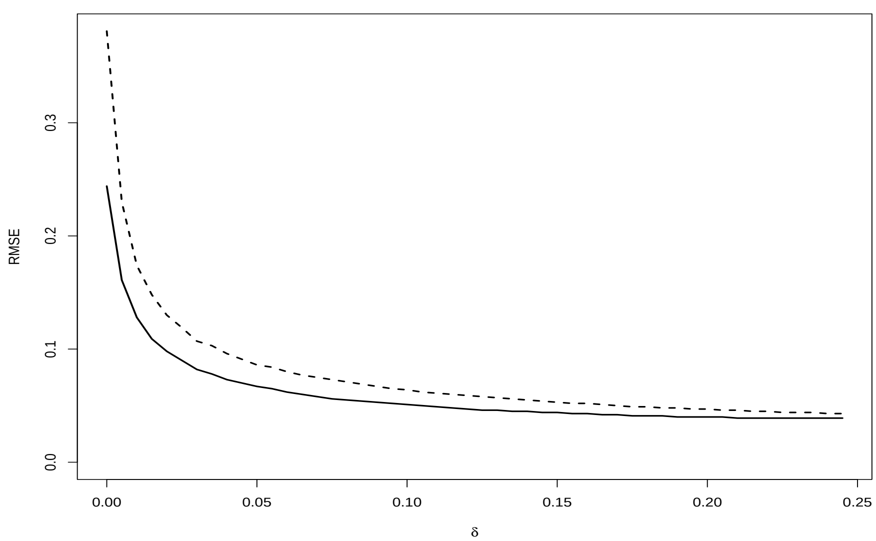

Figure B.96: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$.

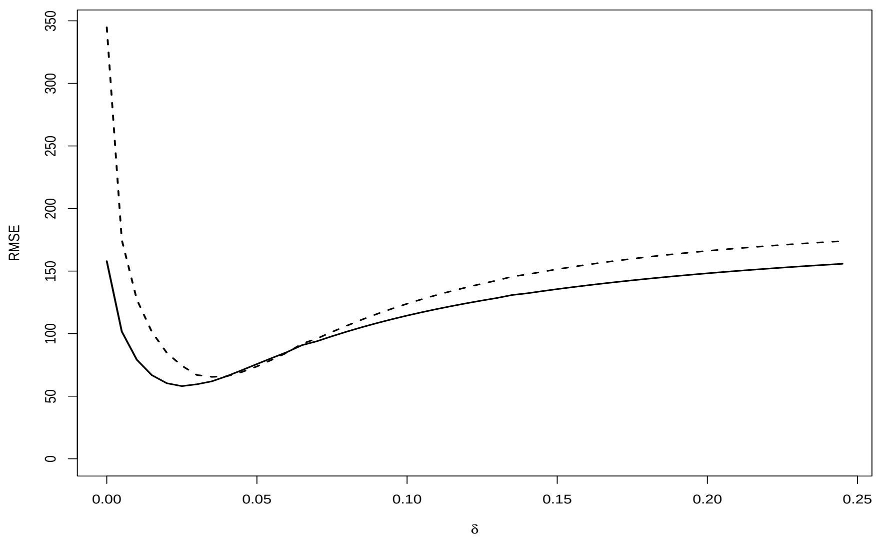

Figure B.97: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$.

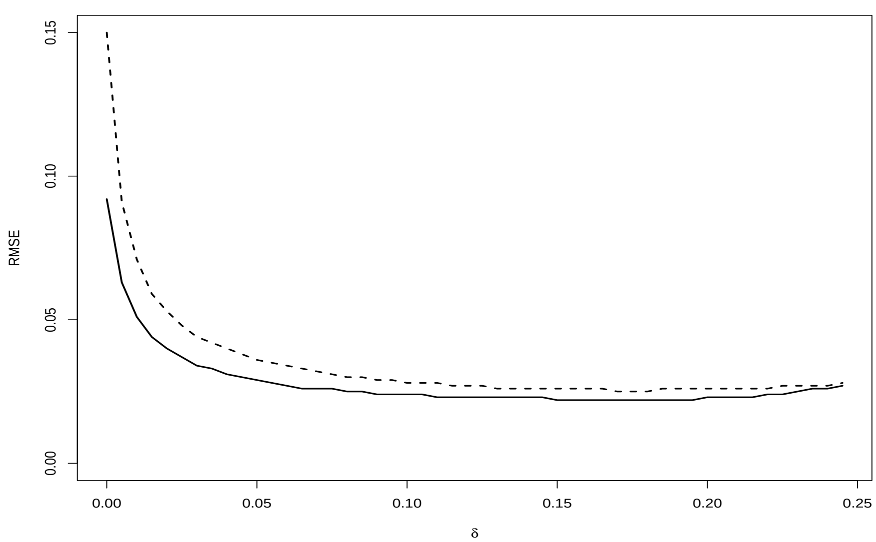

Figure B.98: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$.

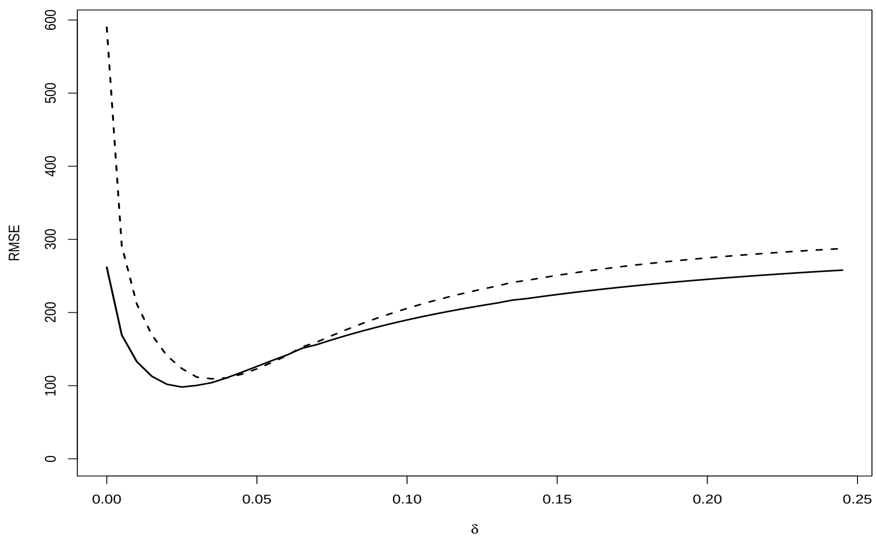

Figure B.99: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$.

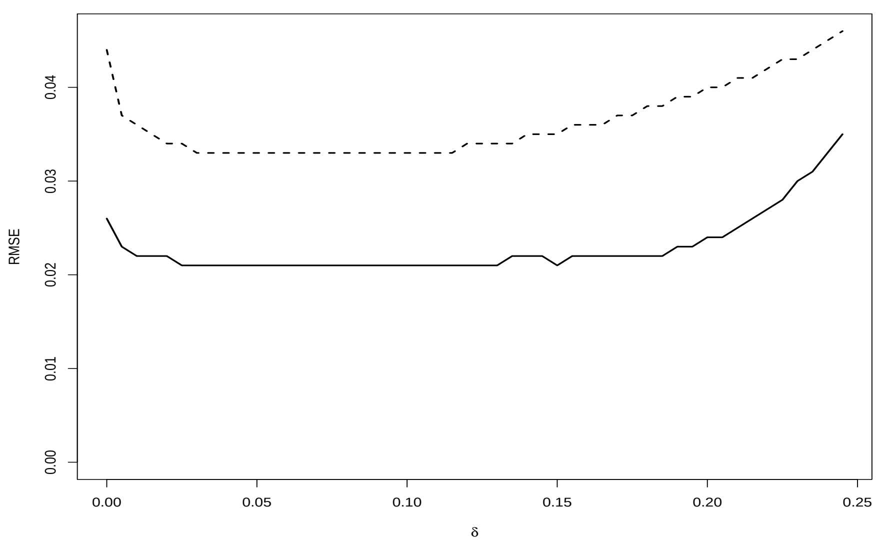

Figure B.100: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Laplace ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$.

B.3 Student t Process

Results are based on simulations of 25 Student t ARMA processes described in the main paper. For the tables, the Local quadratic estimator $\widetilde{f}(\theta)$ is computed via OLS using the data-based optimal bandwidth $\widehat{\delta}_*$, which is determined by using the Flat-top tapered spectral estimator. For the figures, a range of fixed δ values are used, letting this quantity range from .005 to .250 in 50 increments.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.174	0.301	0.348	0.037	0.079	0.087	0.009	0.018	0.020
Flat-top taper	0.105	0.627	0.636	0.061	0.189	0.199	0.019	0.071	0.074
Local ($\widehat{\delta}_*$)	0.097	0.337	0.351	0.013	0.098	0.099	-0.003	0.038	0.038

Table B.101: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-127.222	235.863	267.986	-48.631	231.256	236.314	-23.986	151.442	153.330
Flat-top taper	-61.243	341.476	346.925	17.616	319.262	319.747	18.929	185.916	186.877
Local ($\widehat{\delta}_*$)	-159.751	197.460	253.990	-77.505	192.895	207.883	-32.732	137.942	141.772

Table B.102: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.064	0.231	0.240	-0.005	0.073	0.073	-0.005	0.042	0.043
Flat-top taper	0.013	0.391	0.391	0.014	0.134	0.135	0.004	0.059	0.060
Local ($\widehat{\delta}_*$)	0.048	0.238	0.243	-0.002	0.079	0.079	-0.008	0.037	0.038

Table B.103: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-76.380	141.162	160.501	-28.864	139.683	142.634	-15.990	92.222	93.598
Flat-top taper	-36.176	204.107	207.288	11.208	192.413	192.740	9.318	112.840	113.224
Local ($\widehat{\delta}_*$)	-96.797	116.797	151.695	-46.793	115.743	124.844	-21.164	83.000	85.656

Table B.104: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.052	0.215	0.221	-0.053	0.150	0.159	-0.021	0.098	0.100
Flat-top taper	-0.089	0.302	0.315	-0.046	0.168	0.175	-0.017	0.107	0.108
Local ($\widehat{\delta}_*$)	-0.009	0.221	0.221	-0.037	0.113	0.119	-0.028	0.072	0.077

Table B.105: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-38.710	73.006	82.634	-14.388	72.313	73.730	-8.698	45.561	46.384
Flat-top taper	-18.512	105.028	106.647	5.777	99.429	99.596	3.887	55.407	55.543
Local ($\widehat{\delta}_*$)	-48.747	60.800	77.929	-23.295	60.647	64.967	-11.314	41.073	42.603

Table B.106: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.159	0.332	0.368	-0.111	0.256	0.279	-0.045	0.178	0.184
Flat-top taper	-0.211	0.393	0.446	-0.107	0.282	0.302	-0.039	0.192	0.196
Local ($\widehat{\delta}_*$)	-0.083	0.308	0.319	-0.071	0.186	0.199	-0.046	0.122	0.130

Table B.107: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-14.972	25.043	29.177	-6.124	25.288	26.019	-3.427	15.978	16.341
Flat-top taper	-8.681	35.496	36.542	0.228	34.652	34.653	0.594	19.214	19.223
Local ($\widehat{\delta}_*$)	-18.208	20.974	27.774	-9.258	21.284	23.211	-4.562	14.519	15.219

Table B.108: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.049	0.389	0.392	0.037	0.247	0.250	-0.012	0.170	0.170
Flat-top taper	0.039	0.418	0.420	0.025	0.273	0.274	-0.020	0.191	0.192
Local ($\widehat{\delta}_*$)	-0.143	0.377	0.403	-0.103	0.202	0.227	-0.030	0.134	0.137

Table B.109: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.556	1.703	3.071	-2.264	1.591	2.767	-1.413	1.273	1.902
Flat-top taper	-2.468	2.159	3.279	-2.234	1.769	2.850	-1.503	1.303	1.989
Local ($\widehat{\delta}_*$)	-2.399	1.588	2.877	-2.261	1.412	2.665	-1.626	1.145	1.989

Table B.110: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.086	0.176	0.196	0.052	0.163	0.171	0.009	0.029	0.031
Flat-top taper	-0.463	0.793	0.919	0.061	0.252	0.260	-0.018	0.096	0.098
Local ($\widehat{\delta}_*$)	0.032	0.141	0.145	0.004	0.051	0.051	-0.010	0.041	0.042

Table B.111: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.621	8.173	8.583	-1.411	4.661	4.870	-0.845	2.521	2.659
Flat-top taper	-1.420	10.214	10.312	-0.601	5.326	5.359	-0.320	2.674	2.693
Local ($\widehat{\delta}_*$)	-3.481	7.286	8.075	-1.812	4.307	4.672	-0.959	2.405	2.590

Table B.112: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.022	0.159	0.160	0.034	0.141	0.145	0.012	0.057	0.059
Flat-top taper	-0.346	0.481	0.593	0.017	0.195	0.196	-0.010	0.071	0.072
Local ($\widehat{\delta}_*$)	0.019	0.155	0.156	0.000	0.070	0.070	-0.006	0.040	0.040

Table B.113: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.745	4.569	4.891	-0.862	2.794	2.923	-0.530	1.520	1.610
Flat-top taper	-1.094	5.690	5.794	-0.408	3.185	3.211	-0.231	1.609	1.625
Local ($\widehat{\delta}_*$)	-2.250	4.064	4.645	-1.127	2.590	2.824	-0.601	1.450	1.570

Table B.114: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.003	0.350	0.350	0.001	0.170	0.170	0.022	0.102	0.104
Flat-top taper	-0.203	0.449	0.493	-0.084	0.217	0.233	0.006	0.086	0.086
Local ($\widehat{\delta}_*$)	0.003	0.308	0.308	-0.008	0.142	0.142	-0.015	0.066	0.068

Table B.115: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.115	2.047	2.331	-0.560	1.354	1.465	-0.296	0.711	0.770
Flat-top taper	-0.888	2.433	2.590	-0.444	1.509	1.573	-0.206	0.740	0.768
Local ($\widehat{\delta}_*$)	-1.269	1.801	2.203	-0.745	1.285	1.485	-0.364	0.674	0.765

Table B.116: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.091	0.339	0.351	0.108	0.188	0.217	0.060	0.125	0.139
Flat-top taper	0.085	0.354	0.364	0.099	0.204	0.227	0.036	0.156	0.160
Local ($\widehat{\delta}_*$)	-0.038	0.355	0.358	-0.040	0.175	0.180	-0.029	0.087	0.092

Table B.117: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.398	0.434	0.589	-0.379	0.264	0.462	-0.293	0.209	0.360
Flat-top taper	-0.390	0.475	0.614	-0.376	0.276	0.467	-0.301	0.202	0.362
Local ($\widehat{\delta}_*$)	-0.260	0.498	0.561	-0.263	0.259	0.370	-0.249	0.151	0.291

Table B.118: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.321	0.469	0.568	-0.135	0.351	0.376	-0.027	0.186	0.188
Flat-top taper	-0.316	0.509	0.599	-0.062	0.418	0.422	0.043	0.231	0.235
Local ($\widehat{\delta}_*$)	0.065	0.588	0.592	0.059	0.326	0.331	-0.002	0.178	0.178

Table B.119: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.822	0.425	0.926	0.520	0.384	0.646	0.154	0.104	0.186
Flat-top taper	0.809	0.450	0.926	0.577	0.352	0.676	0.312	0.174	0.358
Local ($\widehat{\delta}_*$)	0.551	0.343	0.649	0.440	0.270	0.517	0.226	0.174	0.285

Table B.120: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.224	0.468	0.519	0.020	0.031	0.037	0.006	0.013	0.014
Flat-top taper	0.144	0.550	0.568	0.006	0.157	0.158	0.003	0.082	0.082
Local ($\widehat{\delta}_*$)	0.147	0.325	0.357	0.009	0.047	0.048	0.002	0.017	0.017

Table B.121: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.428	1.449	1.511	-0.238	0.741	0.778	-0.145	0.391	0.417
Flat-top taper	-0.115	1.673	1.677	-0.012	0.749	0.749	-0.005	0.351	0.351
Local ($\widehat{\delta}_*$)	-0.341	1.301	1.345	-0.209	0.673	0.705	-0.112	0.339	0.357

Table B.122: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.361	0.494	0.612	0.025	0.133	0.135	0.014	0.060	0.062
Flat-top taper	0.305	0.544	0.624	0.002	0.150	0.150	0.000	0.067	0.067
Local ($\widehat{\delta}_*$)	0.190	0.339	0.388	0.024	0.136	0.138	0.008	0.062	0.062

Table B.123: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.398	0.882	0.968	-0.134	0.434	0.454	-0.082	0.235	0.249
Flat-top taper	-0.303	1.019	1.063	-0.005	0.440	0.440	0.001	0.212	0.212
Local ($\widehat{\delta}_*$)	-0.171	0.788	0.806	-0.118	0.387	0.404	-0.065	0.207	0.217

Table B.124: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.027	0.329	0.330	-0.008	0.170	0.170	-0.001	0.102	0.102
Flat-top taper	-0.028	0.335	0.337	-0.008	0.172	0.172	-0.001	0.103	0.103
Local ($\widehat{\delta}_*$)	-0.002	0.403	0.403	-0.003	0.202	0.202	0.001	0.117	0.117

Table B.125: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.017	0.334	0.335	-0.006	0.172	0.172	-0.001	0.102	0.102
Flat-top taper	-0.016	0.349	0.349	-0.006	0.176	0.176	-0.001	0.102	0.102
Local ($\widehat{\delta}_*$)	-0.002	0.405	0.405	-0.002	0.204	0.204	0.000	0.116	0.116

Table B.126: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.561	0.762	0.946	-0.158	0.443	0.470	-0.081	0.247	0.260
Flat-top taper	-0.519	0.835	0.984	-0.047	0.434	0.437	-0.010	0.214	0.214
Local ($\widehat{\delta}_*$)	-0.233	0.706	0.744	-0.126	0.383	0.403	-0.067	0.207	0.218

Table B.127: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.453	0.460	0.646	0.057	0.139	0.150	0.025	0.059	0.064
Flat-top taper	0.395	0.519	0.653	0.019	0.156	0.157	0.004	0.067	0.067
Local ($\widehat{\delta}_*$)	0.173	0.294	0.341	0.026	0.136	0.138	0.008	0.061	0.061

Table B.128: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.691	1.317	1.487	-0.290	0.768	0.821	-0.134	0.418	0.439
Flat-top taper	-0.464	1.460	1.532	-0.088	0.750	0.755	-0.015	0.362	0.363
Local ($\widehat{\delta}_*$)	-0.458	1.164	1.251	-0.228	0.659	0.697	-0.110	0.348	0.365

Table B.129: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.280	0.483	0.558	0.031	0.034	0.046	0.010	0.013	0.016
Flat-top taper	0.214	0.555	0.595	0.024	0.155	0.157	0.006	0.080	0.080
Local ($\widehat{\delta}_*$)	0.143	0.280	0.314	0.009	0.045	0.046	0.002	0.017	0.017

Table B.130: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.813	0.465	0.937	0.490	0.400	0.632	0.127	0.091	0.156
Flat-top taper	0.804	0.482	0.937	0.574	0.352	0.673	0.317	0.174	0.361
Local ($\widehat{\delta}_*$)	0.614	0.399	0.732	0.459	0.275	0.535	0.234	0.174	0.292

Table B.131: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.246	0.521	0.576	-0.107	0.349	0.365	-0.019	0.176	0.177
Flat-top taper	-0.226	0.592	0.634	-0.028	0.426	0.427	0.056	0.229	0.236
Local ($\widehat{\delta}_*$)	0.072	0.603	0.607	0.062	0.322	0.328	0.001	0.176	0.176

Table B.132: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.437	0.375	0.576	-0.389	0.252	0.463	-0.293	0.216	0.364
Flat-top taper	-0.435	0.389	0.584	-0.391	0.247	0.462	-0.314	0.199	0.372
Local ($\widehat{\delta}_*$)	-0.295	0.459	0.546	-0.272	0.250	0.369	-0.255	0.150	0.296

Table B.133: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.100	0.320	0.335	0.113	0.184	0.216	0.070	0.120	0.139
Flat-top taper	0.097	0.335	0.348	0.106	0.201	0.227	0.044	0.151	0.157
Local ($\widehat{\delta}_*$)	-0.037	0.348	0.350	-0.040	0.176	0.181	-0.030	0.086	0.091

Table B.134: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.556	1.656	2.272	-0.703	1.191	1.383	-0.308	0.717	0.781
Flat-top taper	-1.513	1.754	2.316	-0.702	1.269	1.450	-0.273	0.719	0.770
Local ($\widehat{\delta}_*$)	-1.611	1.407	2.139	-0.902	1.122	1.440	-0.395	0.669	0.777

Table B.135: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.137	0.385	0.409	0.035	0.170	0.173	0.036	0.116	0.122
Flat-top taper	-0.094	0.491	0.500	-0.081	0.223	0.238	0.010	0.086	0.087
Local ($\widehat{\delta}_*$)	0.003	0.304	0.304	-0.003	0.147	0.147	-0.015	0.067	0.068

Table B.136: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.747	3.426	4.391	-1.200	2.547	2.815	-0.548	1.491	1.589
Flat-top taper	-2.557	3.806	4.585	-0.965	2.738	2.903	-0.349	1.517	1.557
Local ($\widehat{\delta}_*$)	-3.026	3.175	4.386	-1.410	2.357	2.746	-0.644	1.391	1.533

Table B.137: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.065	0.184	0.195	0.061	0.167	0.178	0.022	0.082	0.085
Flat-top taper	-0.353	0.466	0.585	0.018	0.210	0.211	-0.004	0.073	0.074
Local ($\widehat{\delta}_*$)	0.021	0.148	0.149	0.001	0.068	0.068	-0.005	0.039	0.039

Table B.138: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-4.535	5.838	7.392	-1.974	4.215	4.654	-0.891	2.572	2.722
Flat-top taper	-4.152	6.550	7.755	-1.503	4.559	4.801	-0.526	2.634	2.686
Local ($\widehat{\delta}_*$)	-4.913	5.474	7.355	-2.261	3.914	4.520	-1.034	2.393	2.607

Table B.139: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.106	0.218	0.242	0.072	0.213	0.225	0.013	0.049	0.051
Flat-top taper	-0.505	0.738	0.895	0.056	0.280	0.286	-0.015	0.097	0.098
Local ($\widehat{\delta}_*$)	0.031	0.118	0.122	0.006	0.046	0.046	-0.008	0.036	0.037

Table B.140: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.923	0.654	2.995	-2.485	1.186	2.753	-1.490	1.205	1.916
Flat-top taper	-2.917	0.693	2.998	-2.511	1.188	2.777	-1.675	1.168	2.042
Local ($\widehat{\delta}_*$)	-2.810	0.664	2.887	-2.482	0.991	2.672	-1.759	1.051	2.049

Table B.141: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.077	0.369	0.377	0.078	0.219	0.232	0.007	0.155	0.156
Flat-top taper	0.075	0.390	0.397	0.070	0.251	0.261	-0.001	0.185	0.185
Local ($\widehat{\delta}_*$)	-0.075	0.378	0.386	-0.084	0.199	0.216	-0.025	0.131	0.133

Table B.142: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-27.321	9.037	28.777	-14.055	14.755	20.378	-5.847	12.712	13.992
Flat-top taper	-26.268	10.896	28.439	-11.086	17.837	21.002	-3.062	14.266	14.591
Local ($\widehat{\delta}_*$)	-27.569	9.290	29.092	-14.290	15.178	20.847	-6.119	12.314	13.750

Table B.143: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.044	0.367	0.369	-0.002	0.250	0.250	-0.004	0.168	0.168
Flat-top taper	-0.026	0.459	0.460	0.010	0.298	0.299	0.002	0.193	0.193
Local ($\widehat{\delta}_*$)	-0.030	0.334	0.336	-0.024	0.193	0.195	-0.026	0.118	0.121

Table B.144: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-75.067	24.443	78.946	-38.634	40.707	56.122	-16.557	35.748	39.396
Flat-top taper	-71.030	29.802	77.029	-29.028	50.146	57.942	-7.875	40.997	41.746
Local ($\widehat{\delta}_*$)	-75.076	25.805	79.387	-38.351	42.020	56.890	-16.432	35.102	38.757

Table B.145: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.072	0.281	0.290	0.015	0.170	0.171	0.005	0.104	0.104
Flat-top taper	0.025	0.358	0.359	0.026	0.178	0.180	0.009	0.108	0.108
Local ($\widehat{\delta}_*$)	0.036	0.227	0.230	-0.004	0.114	0.114	-0.013	0.069	0.071

Table B.146: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-146.025	50.348	154.461	-75.320	80.389	110.161	-32.102	70.910	77.838
Flat-top taper	-137.449	61.584	150.615	-55.701	99.112	113.692	-14.892	80.966	82.324
Local ($\widehat{\delta}_*$)	-145.847	52.537	155.021	-74.410	82.524	111.117	-31.829	69.202	76.171

Table B.147: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.137	0.322	0.350	0.027	0.074	0.078	0.007	0.040	0.040
Flat-top taper	0.095	0.456	0.466	0.056	0.143	0.153	0.017	0.061	0.063
Local ($\widehat{\delta}_*$)	0.089	0.235	0.251	0.012	0.075	0.076	-0.002	0.035	0.035

Table B.148: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-242.606	81.102	255.803	-124.884	132.160	181.830	-53.662	117.879	129.519
Flat-top taper	-228.576	99.010	249.098	-92.192	163.843	188.000	-24.999	134.933	137.229
Local ($\widehat{\delta}_*$)	-242.064	84.913	256.525	-123.055	137.354	184.414	-52.873	116.247	127.707

Table B.149: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.214	0.400	0.453	0.044	0.060	0.074	0.011	0.016	0.020
Flat-top taper	0.172	0.699	0.720	0.092	0.206	0.225	0.027	0.075	0.080
Local ($\widehat{\delta}_*$)	0.137	0.299	0.329	0.018	0.094	0.096	-0.002	0.035	0.035

Table B.150: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

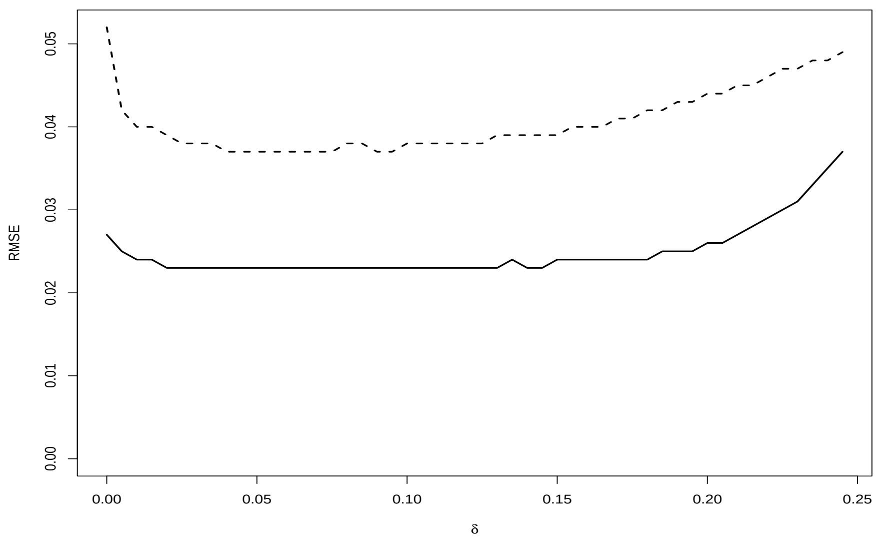

Figure B.101: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$.

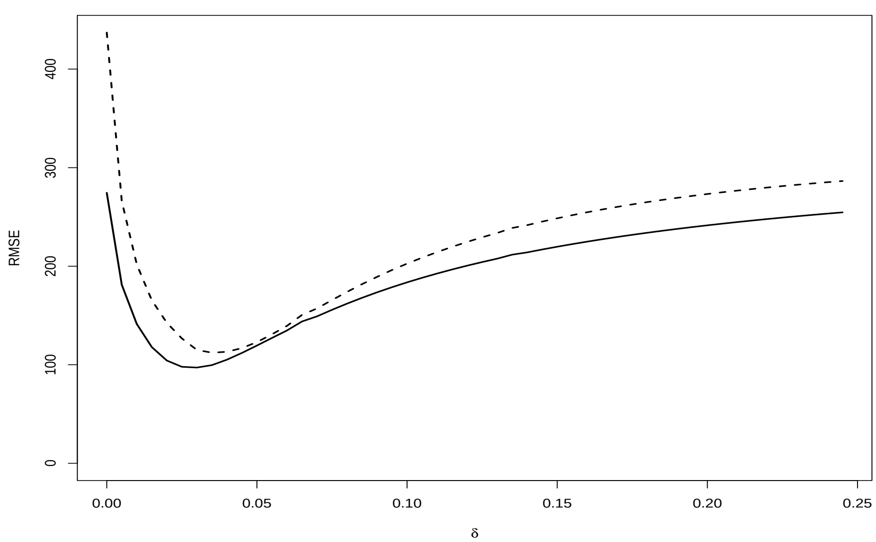

Figure B.102: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.8$.

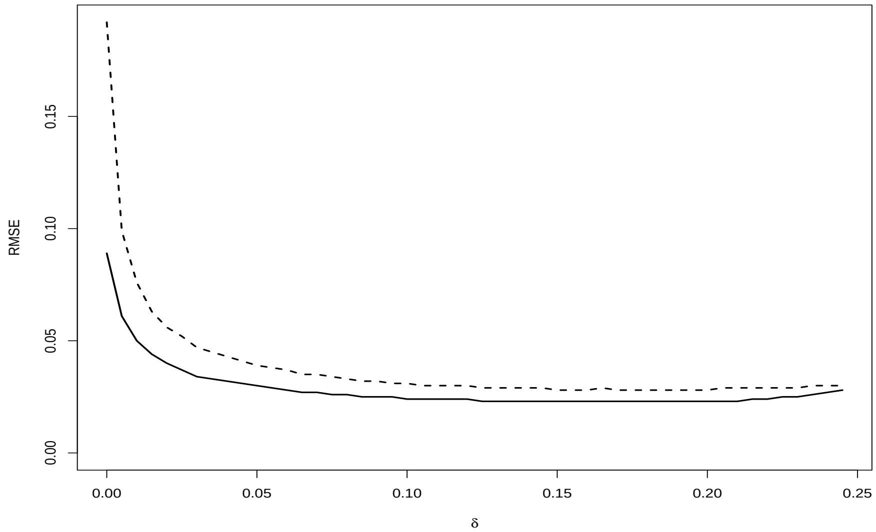

Figure B.103: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$.

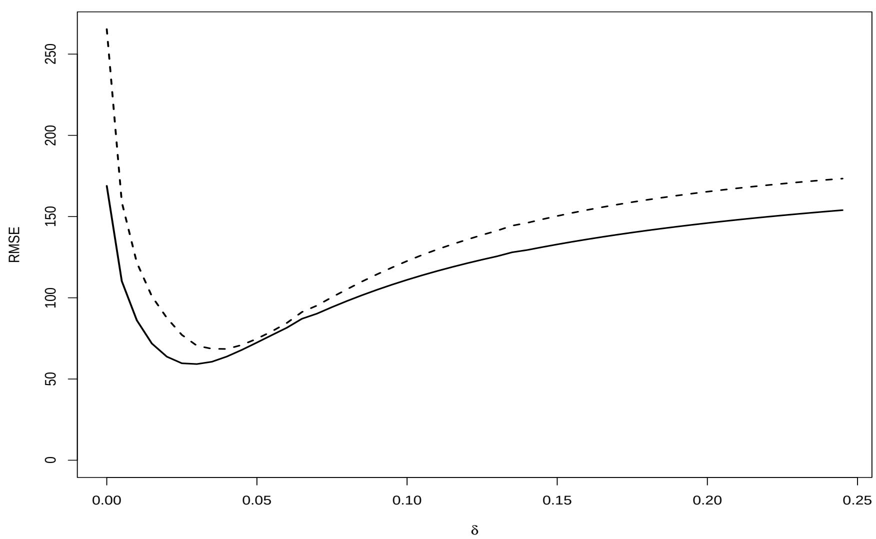

Figure B.104: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = -.4$.

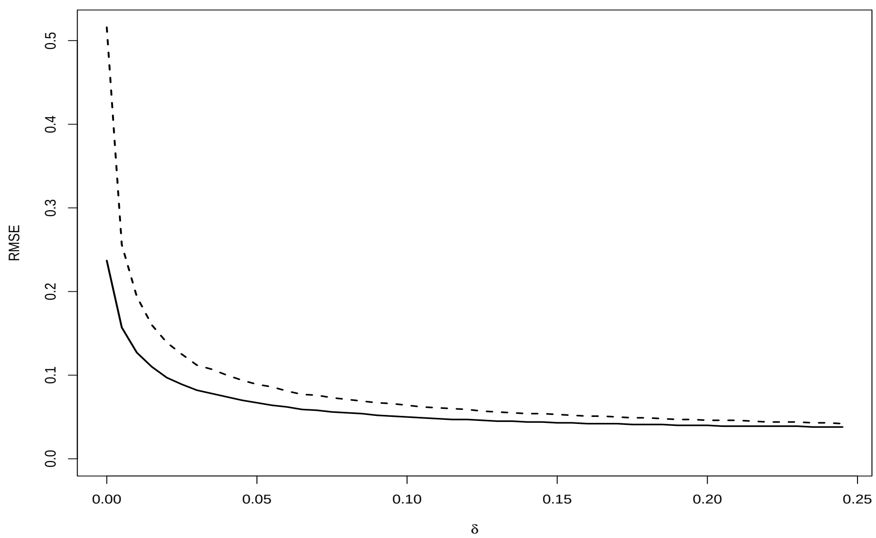

Figure B.105: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$.

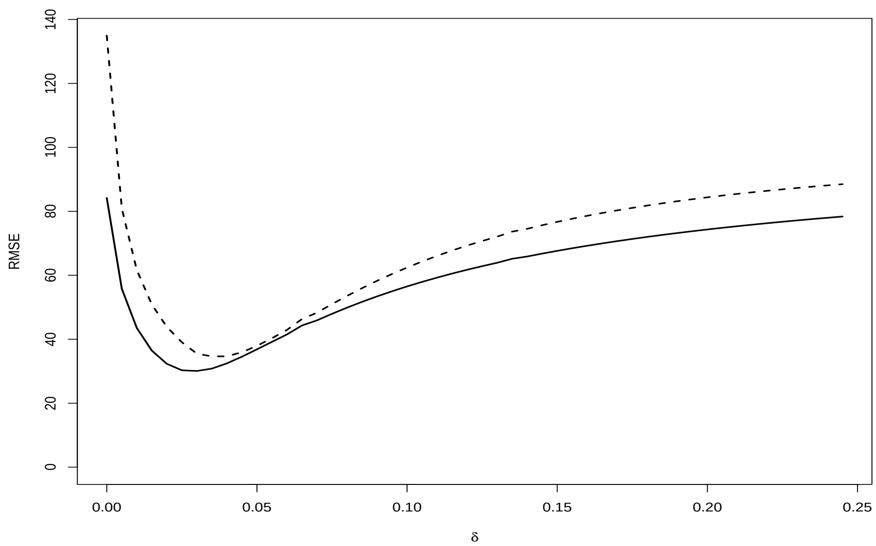

Figure B.106: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = 0$.

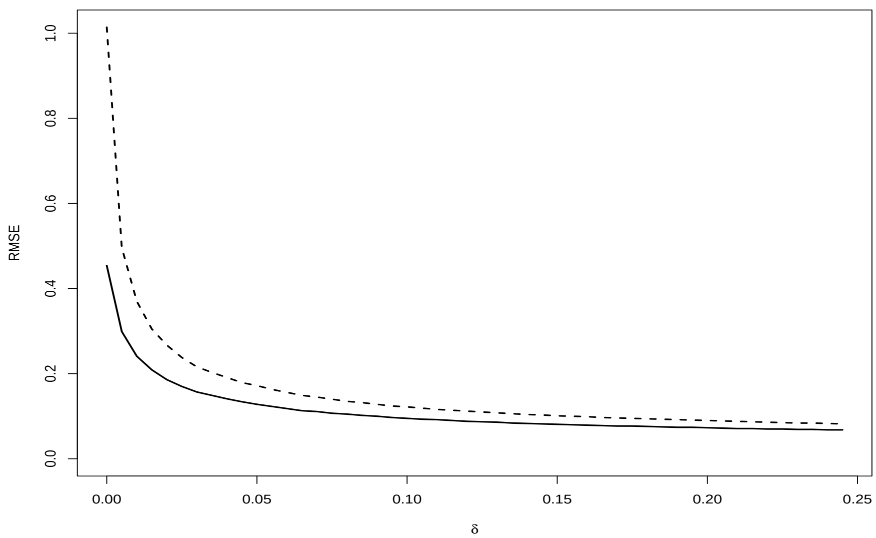

Figure B.107: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$.

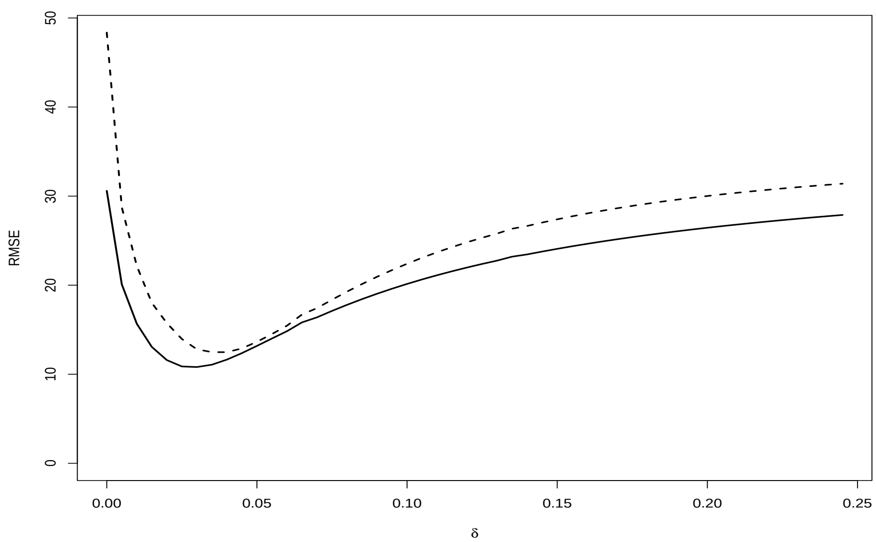

Figure B.108: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .4$.

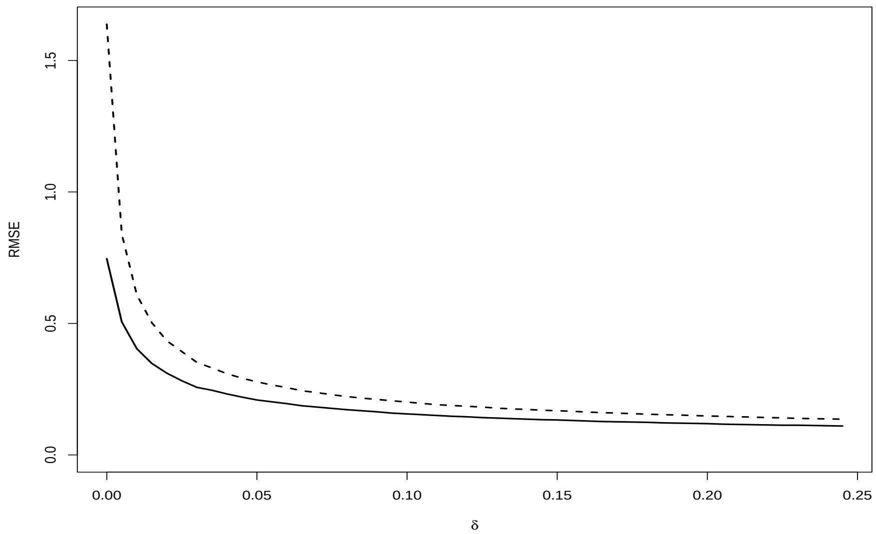

Figure B.109: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$.

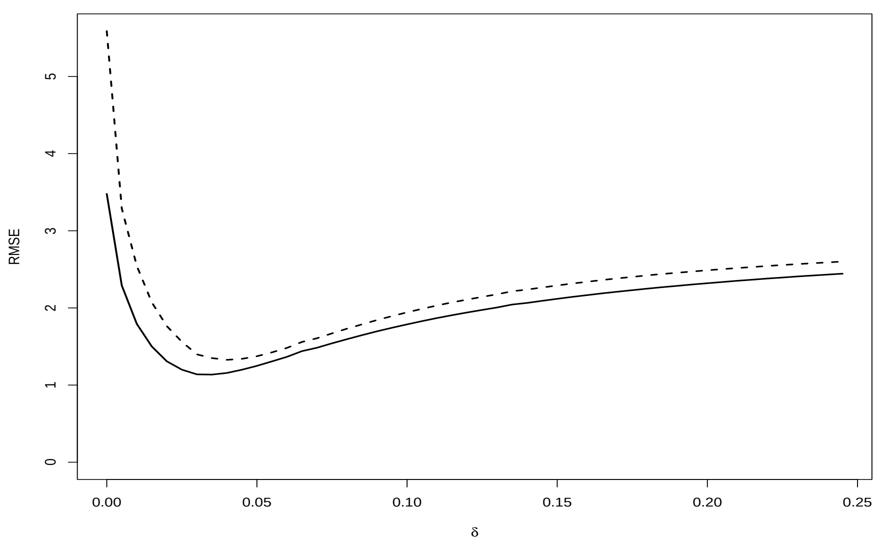

Figure B.110: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.9$ and $\vartheta = .8$.

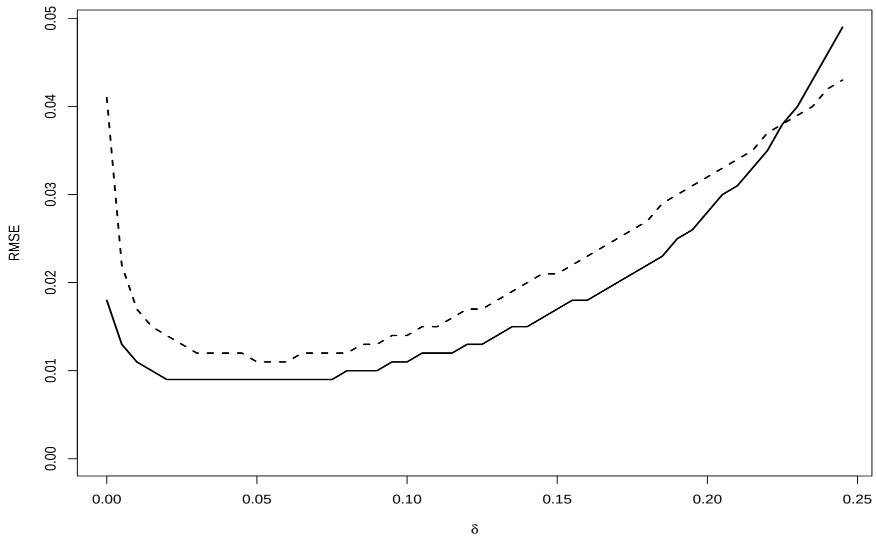

Figure B.111: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$.

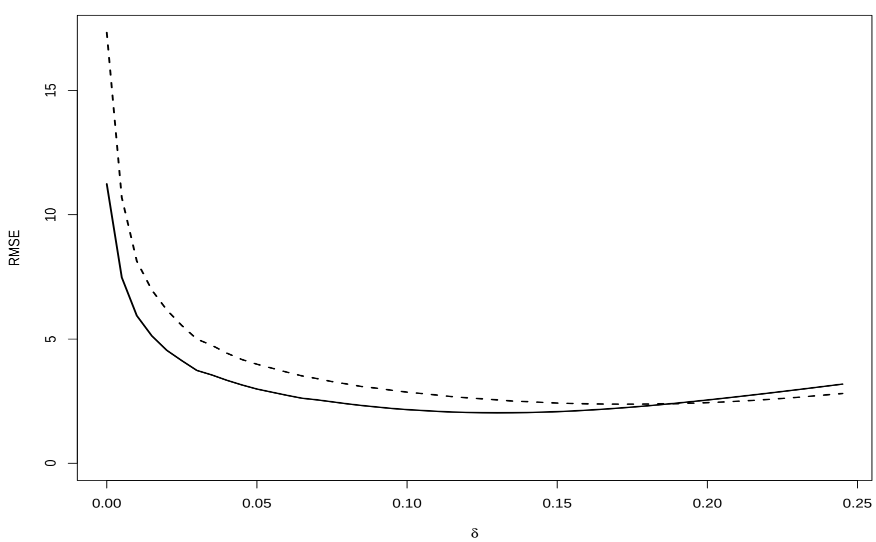

Figure B.112: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.8$.

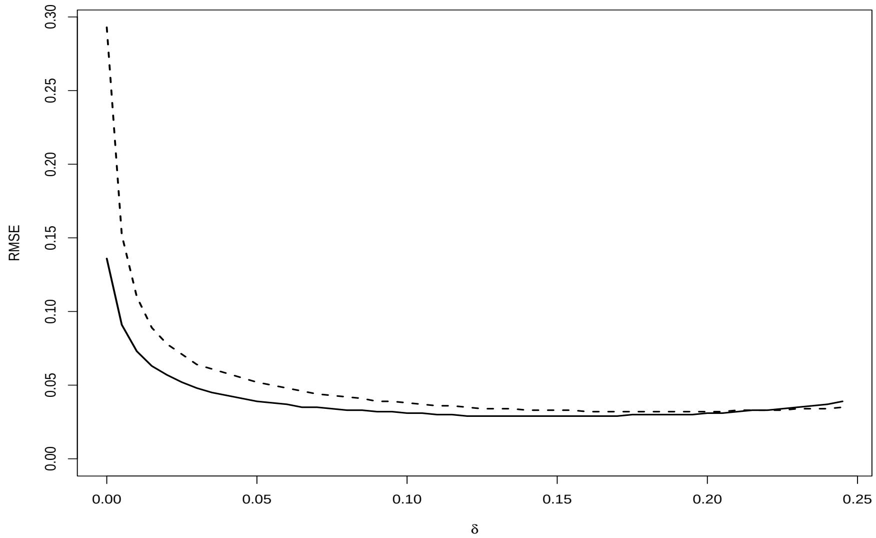

Figure B.113: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$.

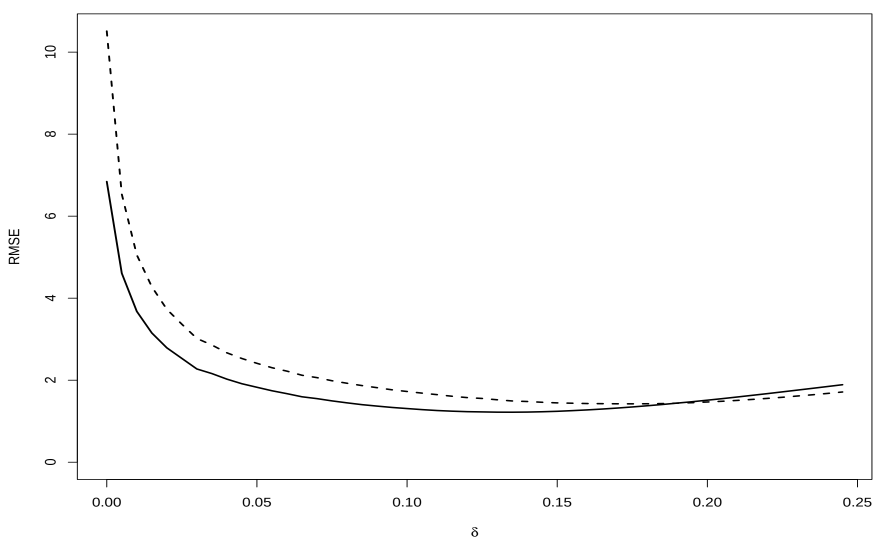

Figure B.114: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = -.4$.

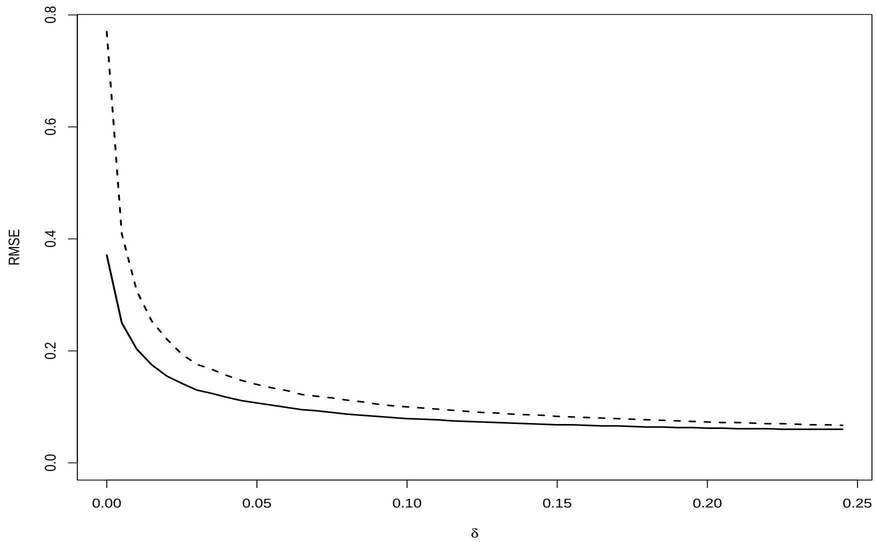

Figure B.115: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$.

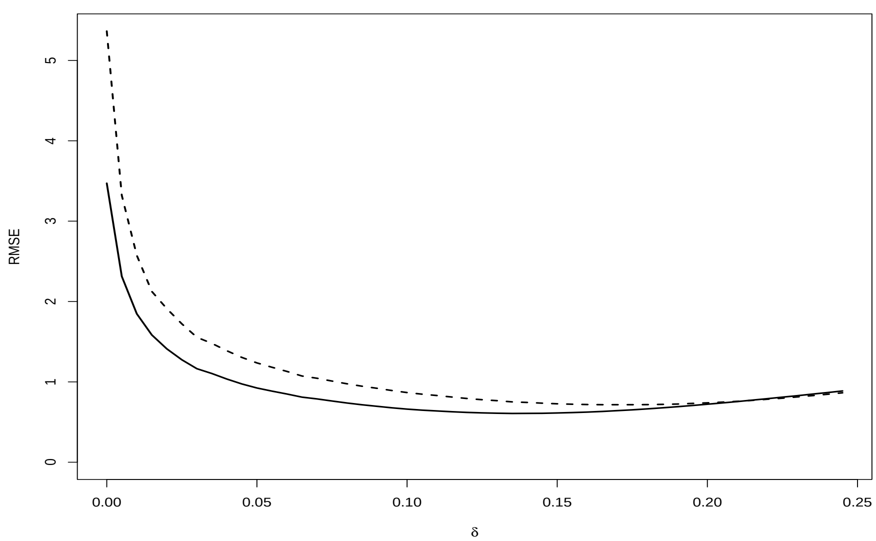

Figure B.116: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = 0$.

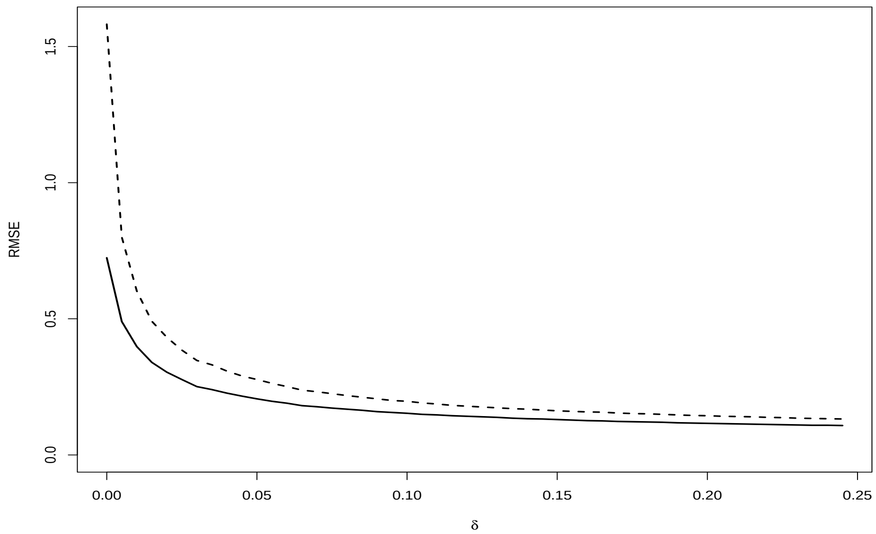

Figure B.117: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$.

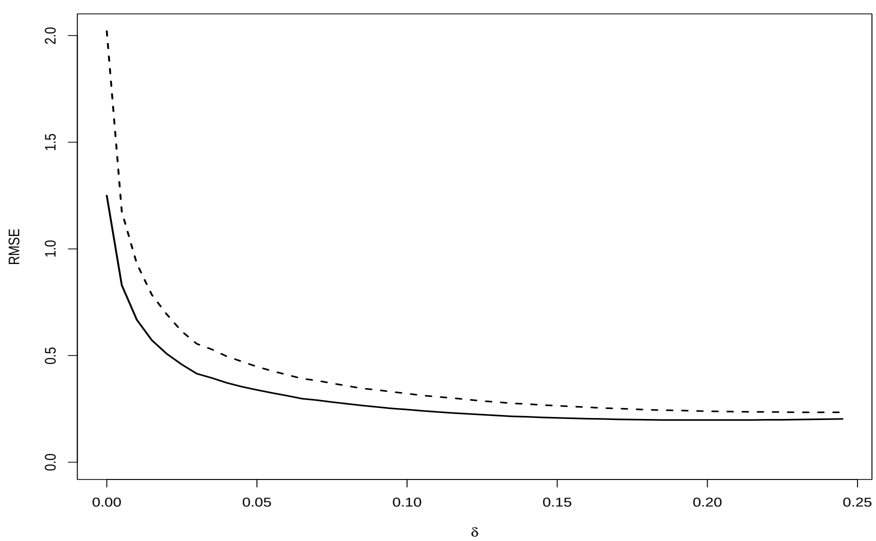

Figure B.118: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .4$.

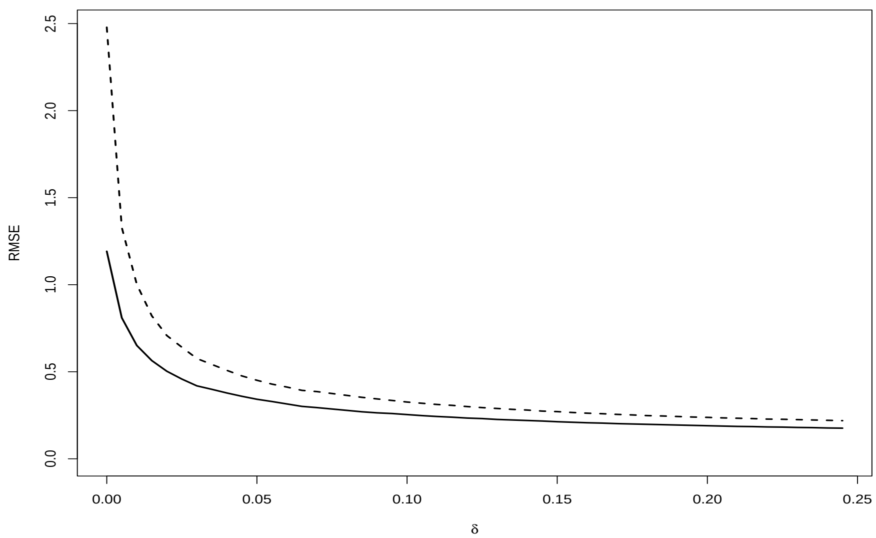

Figure B.119: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$.

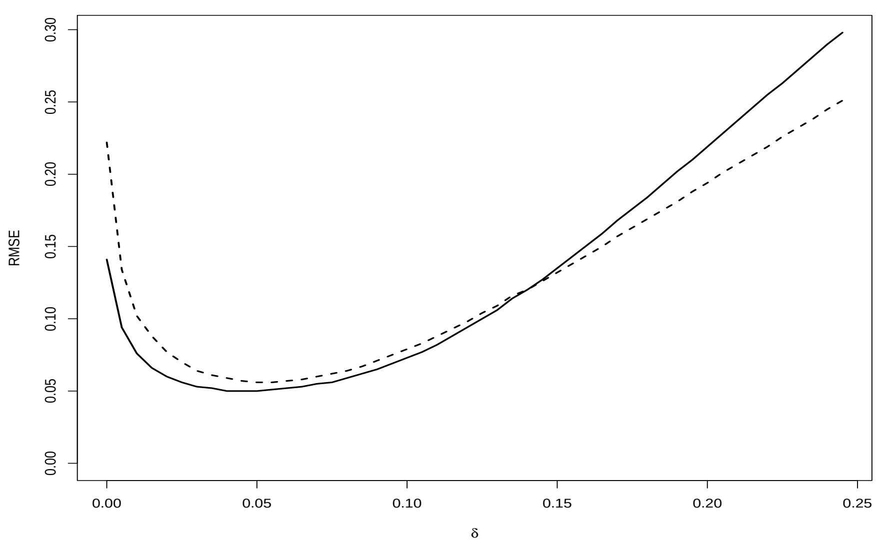

Figure B.120: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = -.5$ and $\vartheta = .8$.

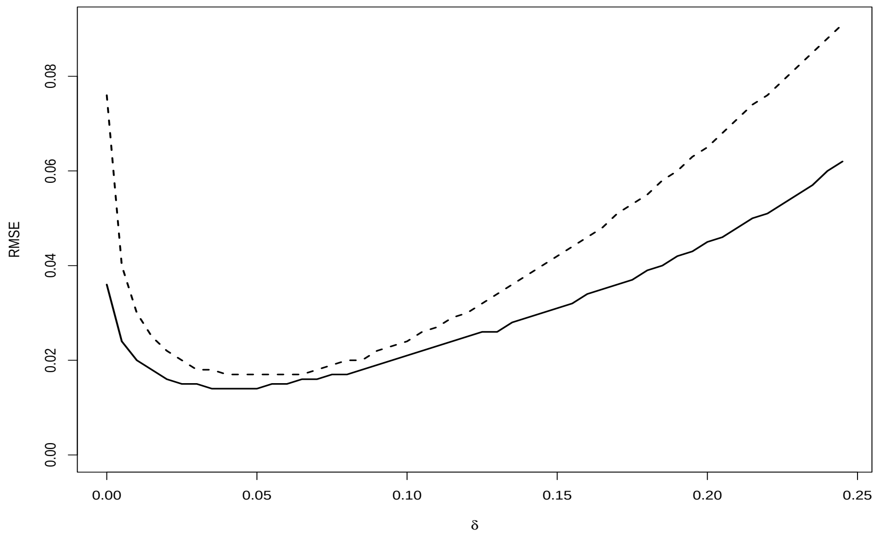

Figure B.121: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$.

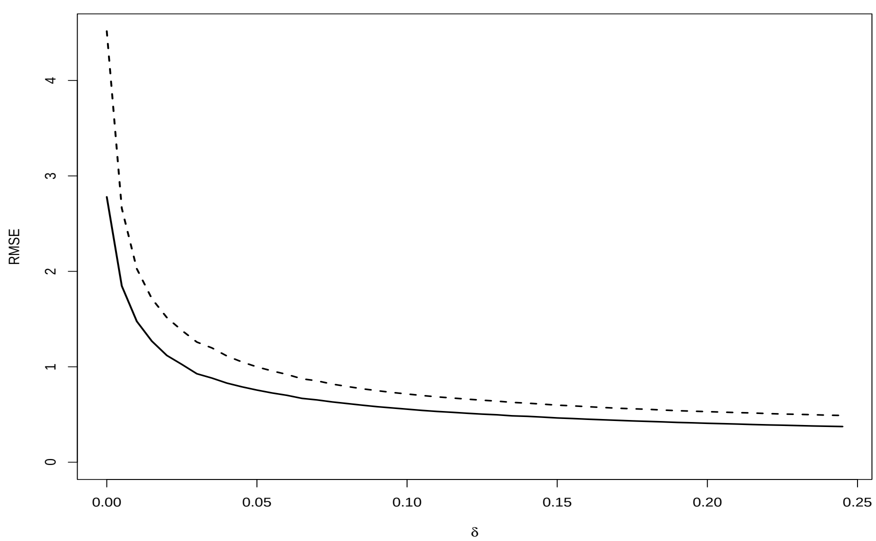

Figure B.122: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.8$.

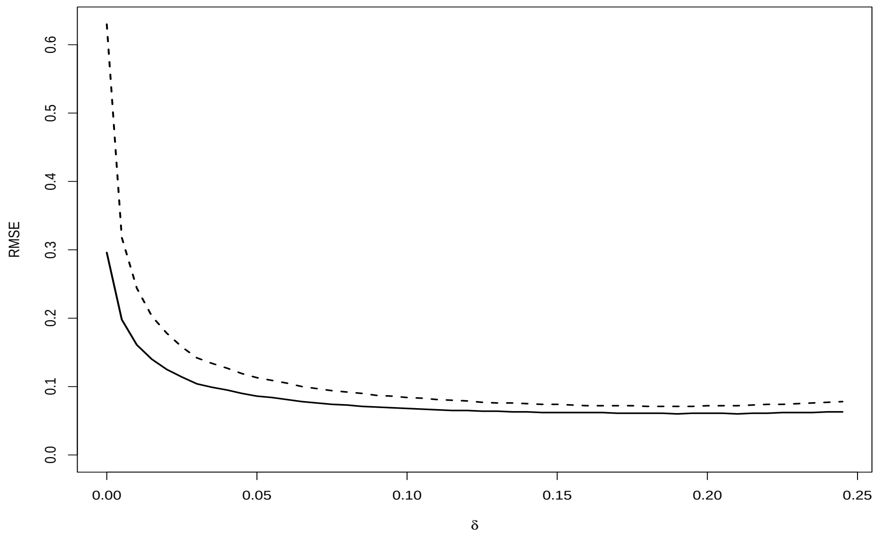

Figure B.123: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$.

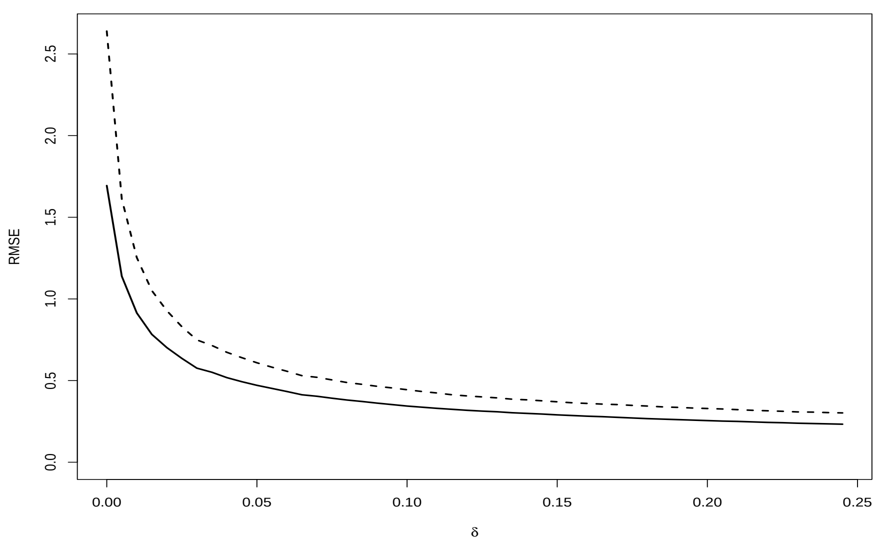

Figure B.124: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = -.4$.

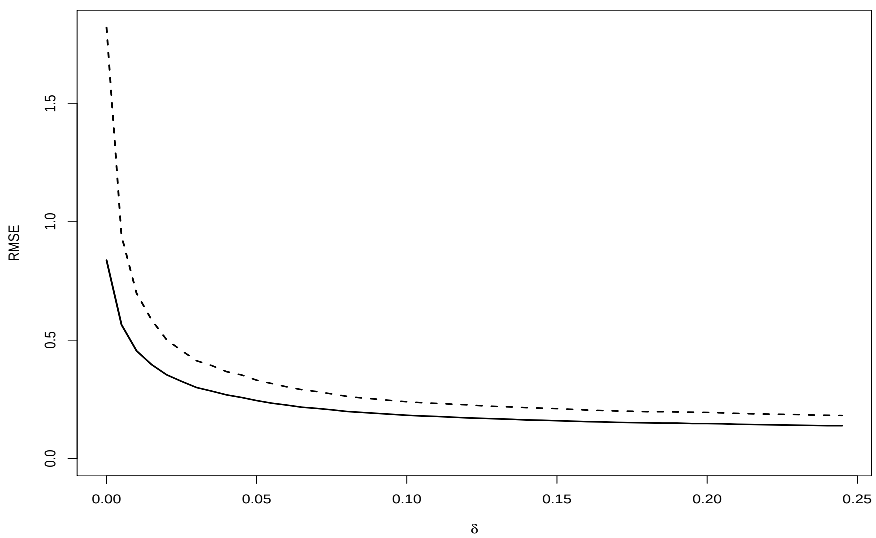

Figure B.125: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$.

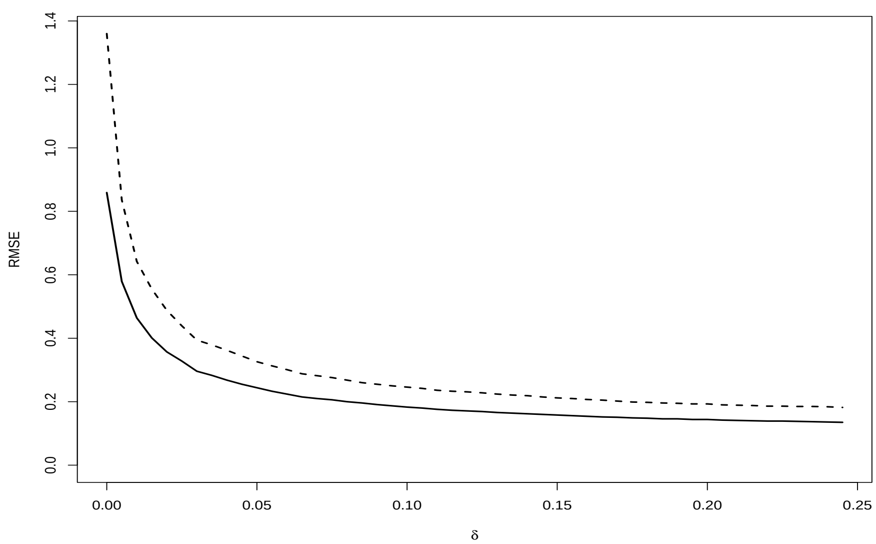

Figure B.126: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = 0$.

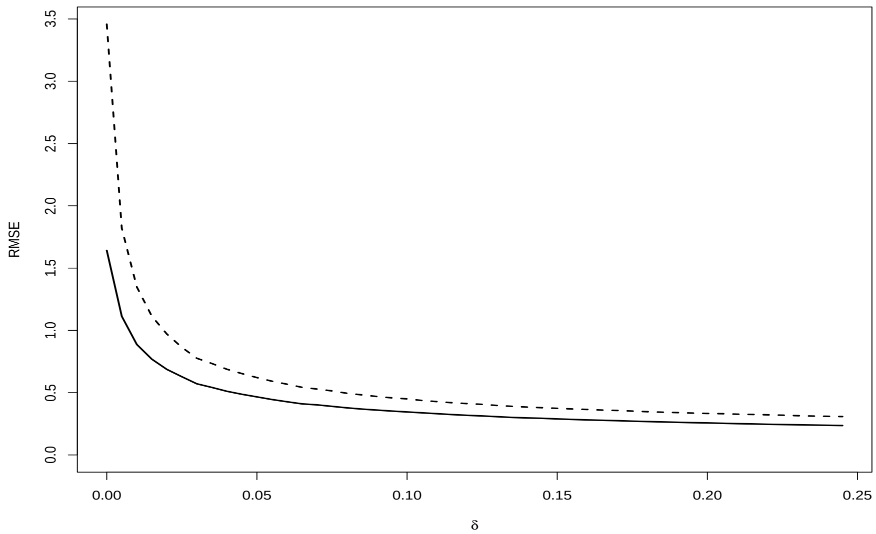

Figure B.127: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$.

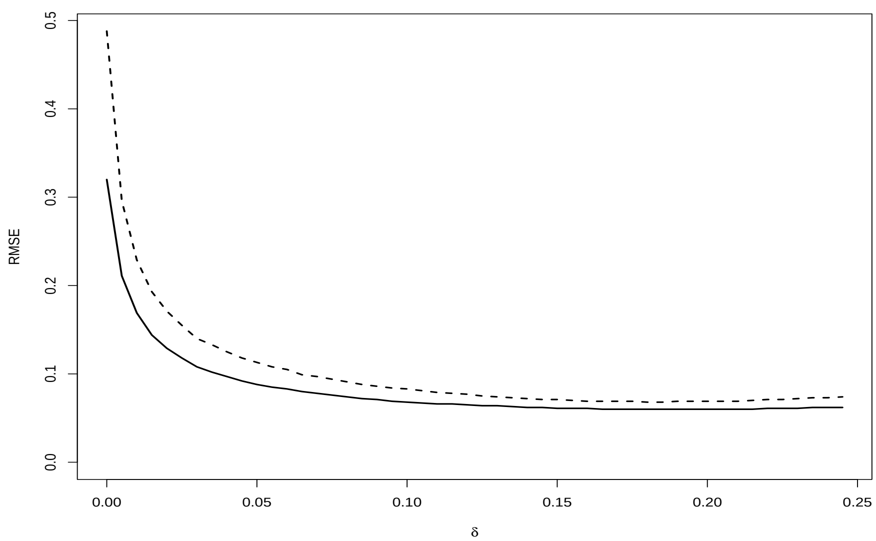

Figure B.128: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = .4$.

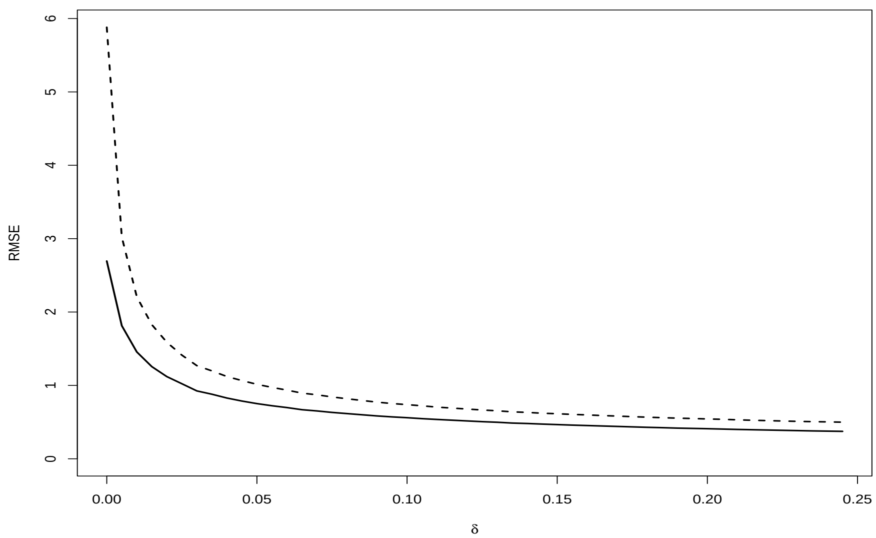

Figure B.129: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$.

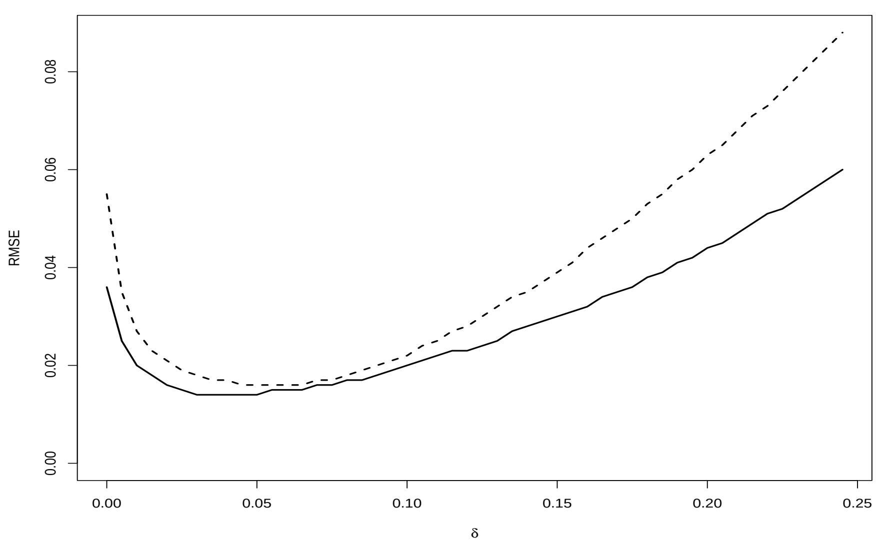

Figure B.130: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = 0$ and $\vartheta = .8$.

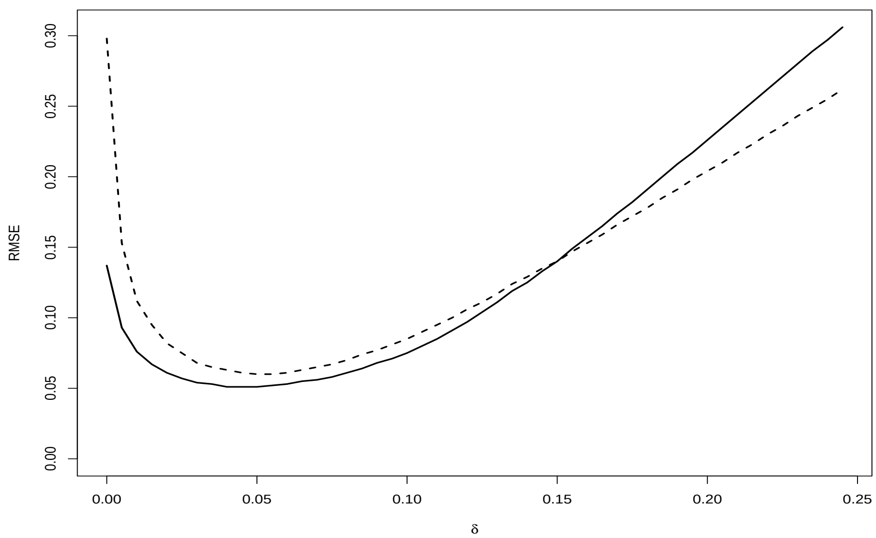

Figure B.131: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$.

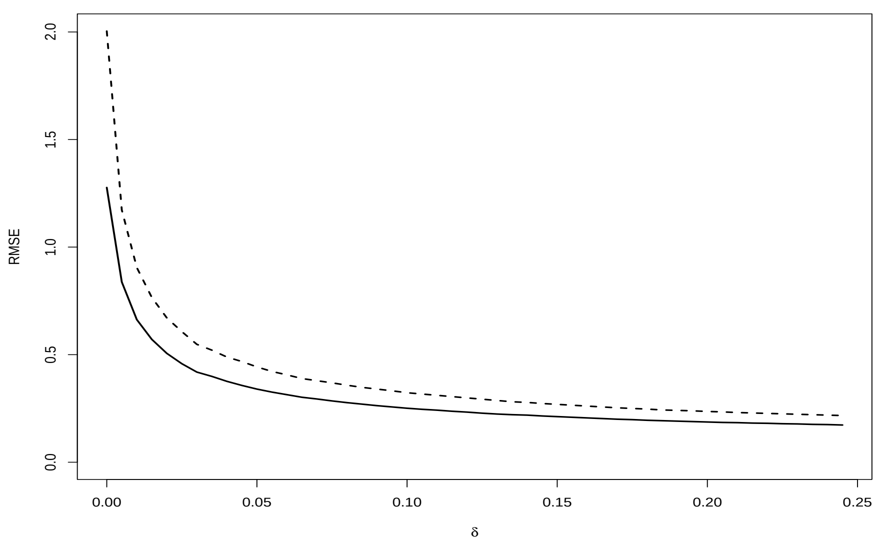

Figure B.132: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.8$.

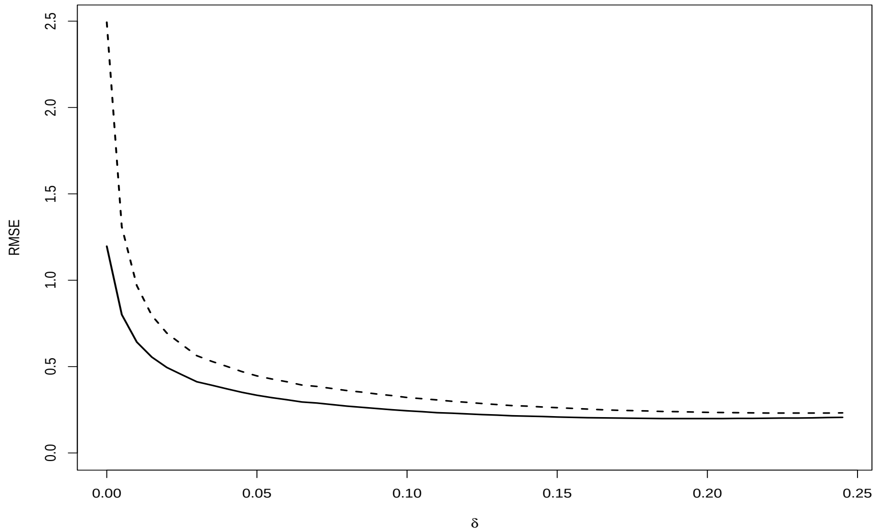

Figure B.133: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$.

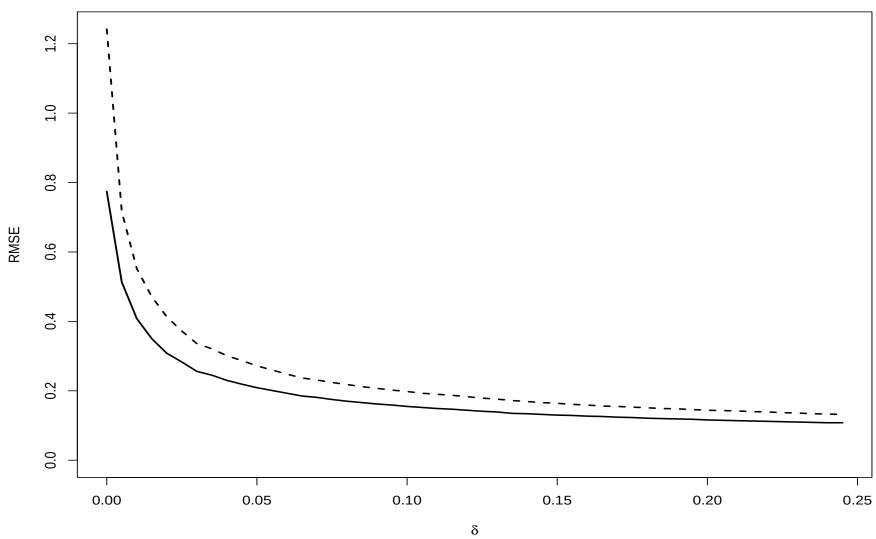

Figure B.134: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = -.4$.

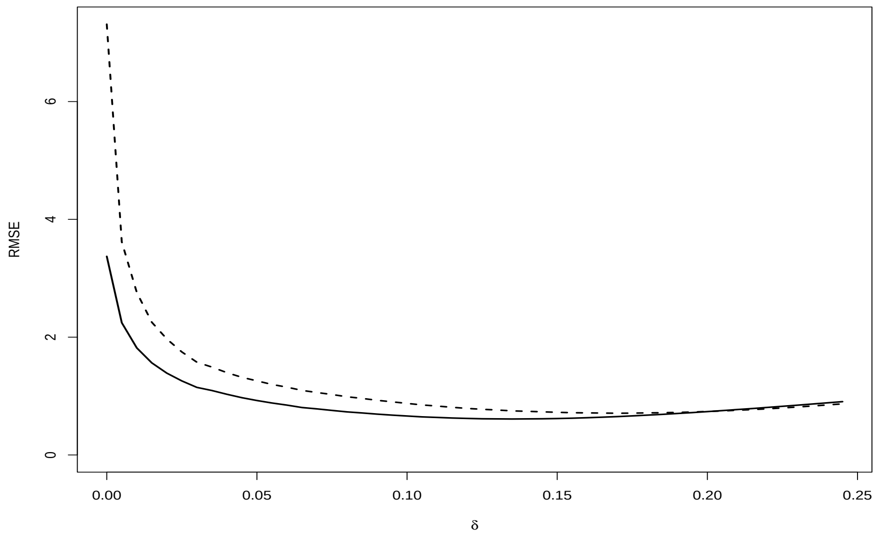

Figure B.135: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$.

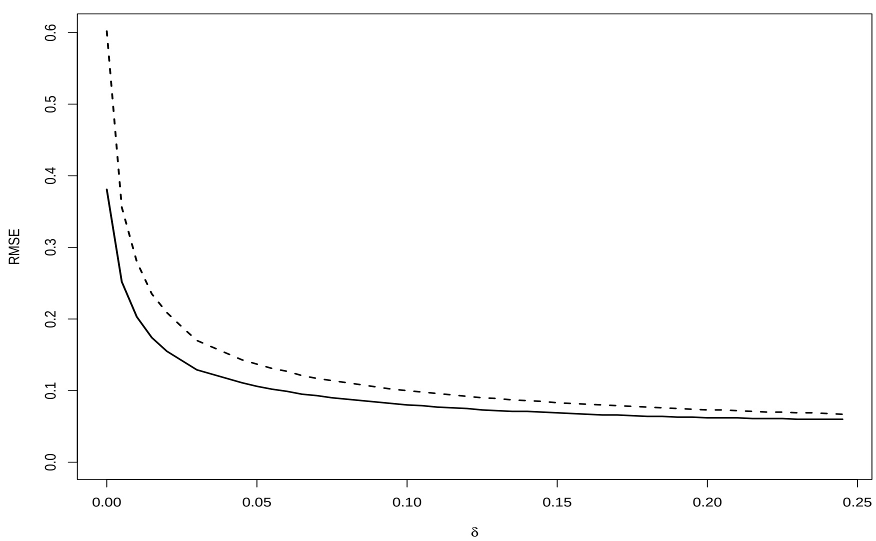

Figure B.136: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = 0$.

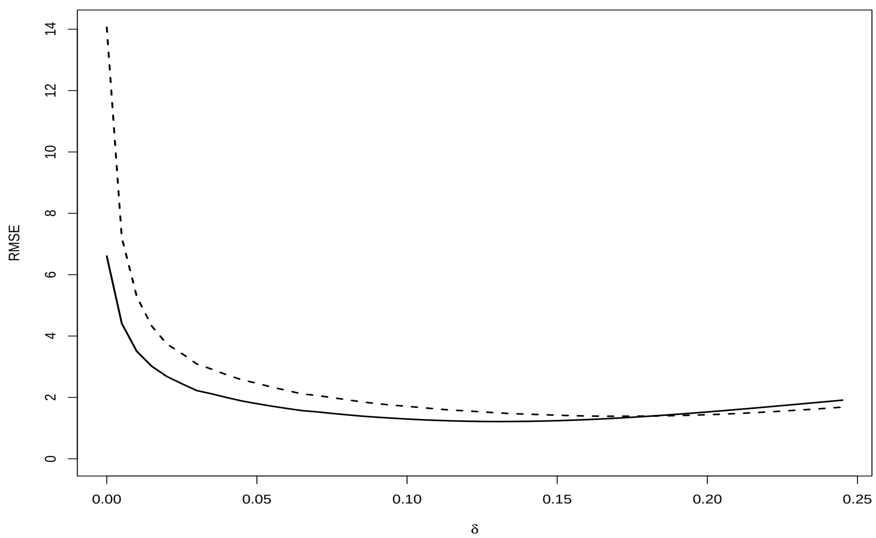

Figure B.137: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$.

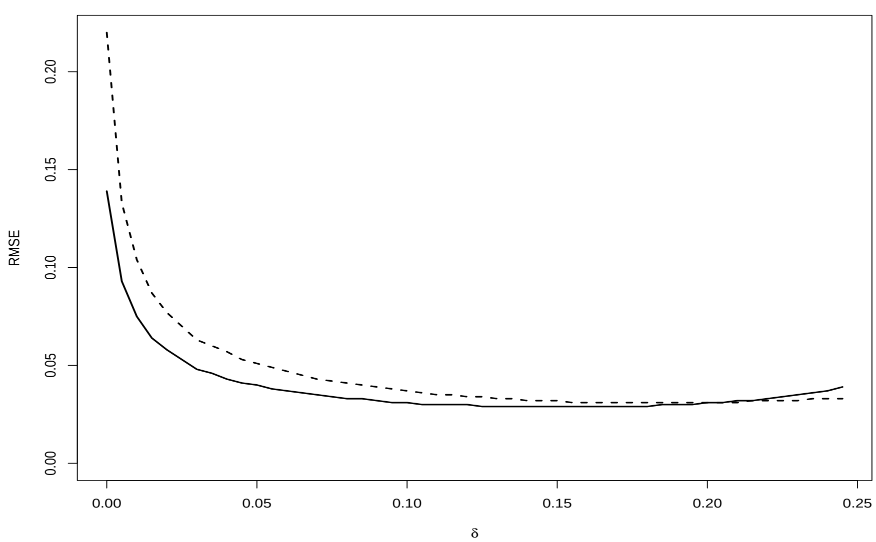

Figure B.138: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = .4$.

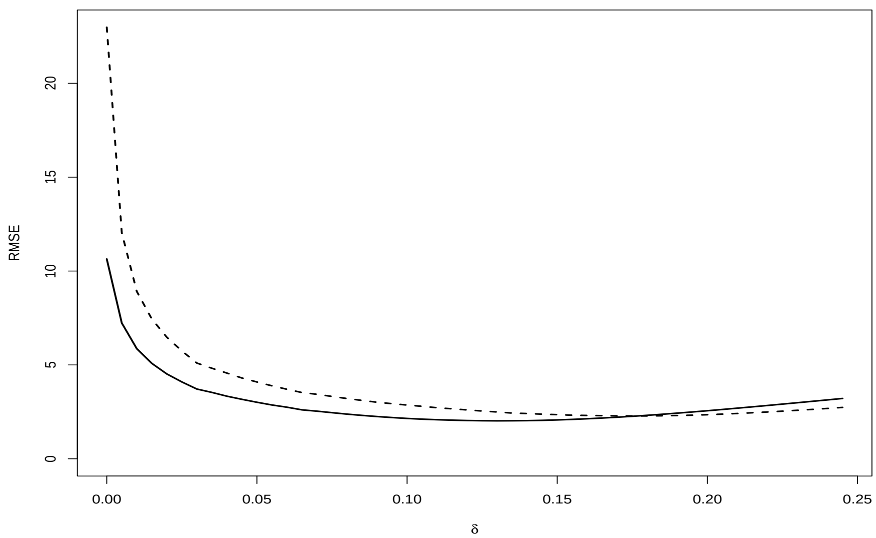

Figure B.139: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$.

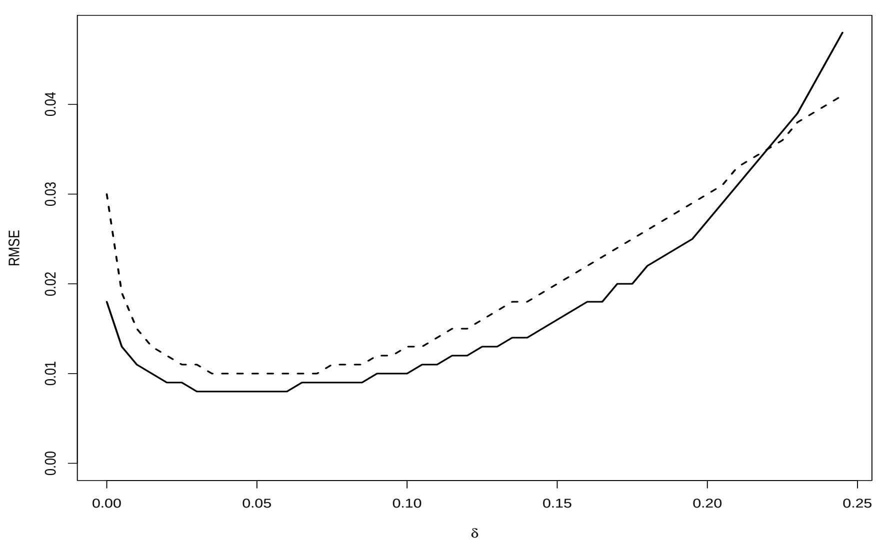

Figure B.140: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .5$ and $\vartheta = .8$.

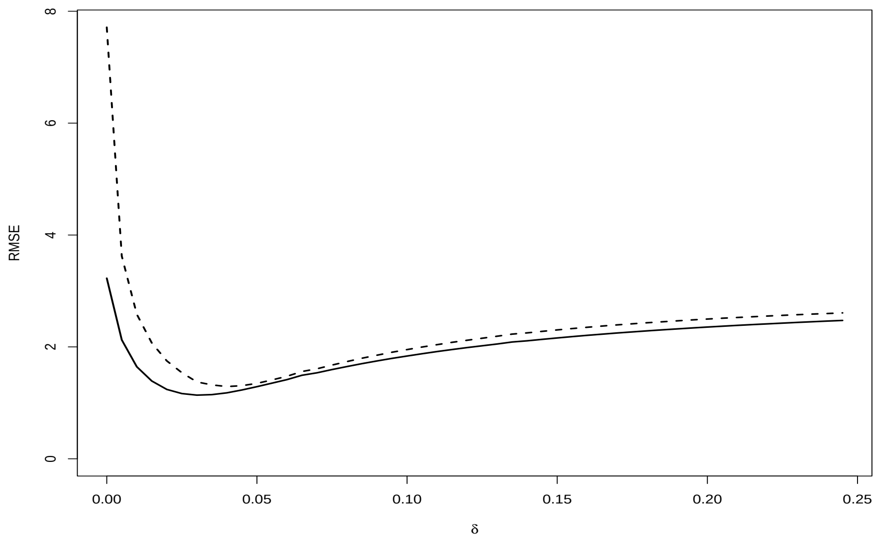

Figure B.141: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$.

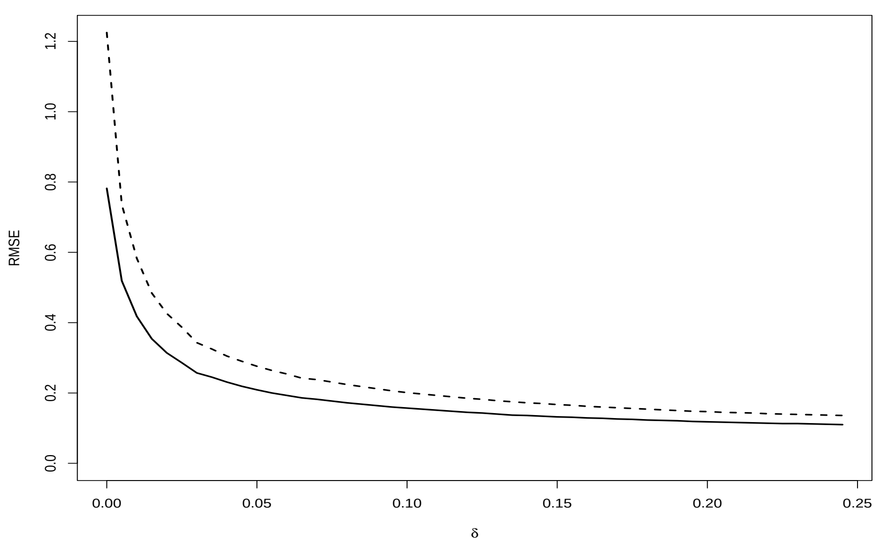

Figure B.142: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.8$.

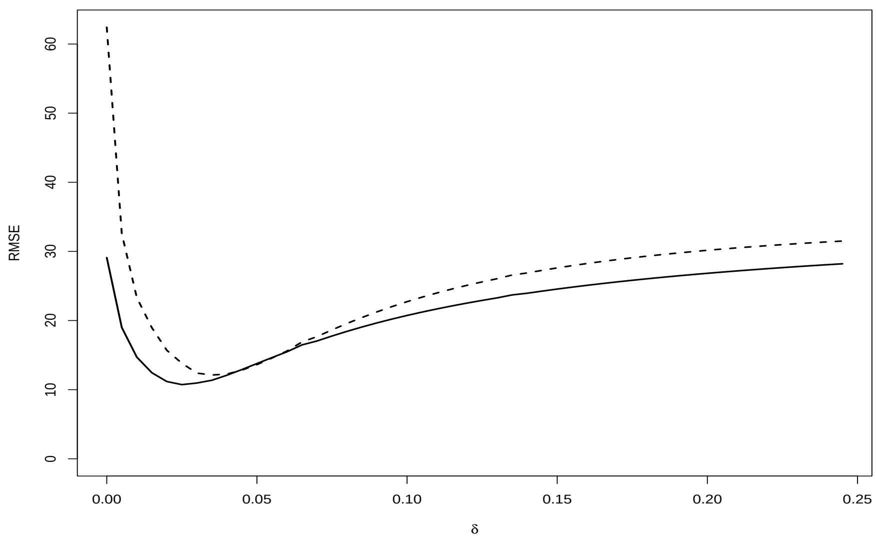

Figure B.143: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$.

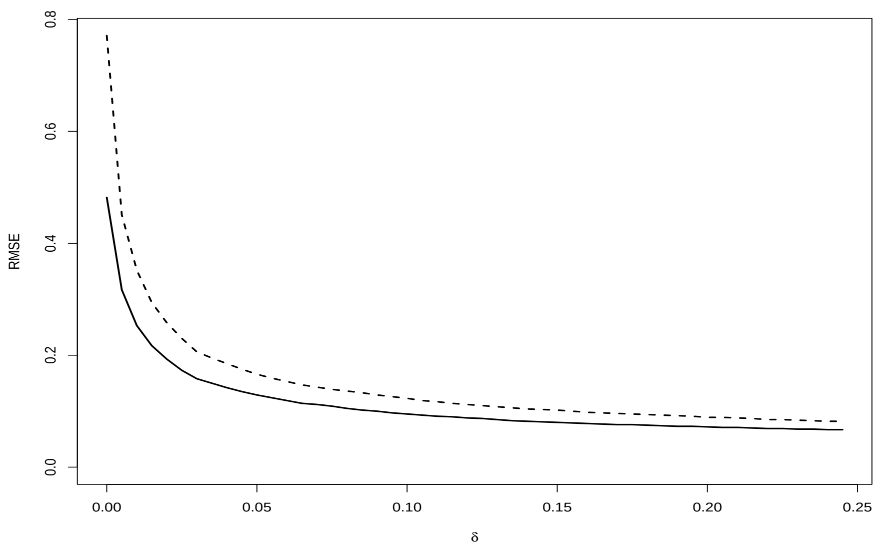

Figure B.144: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = -.4$.

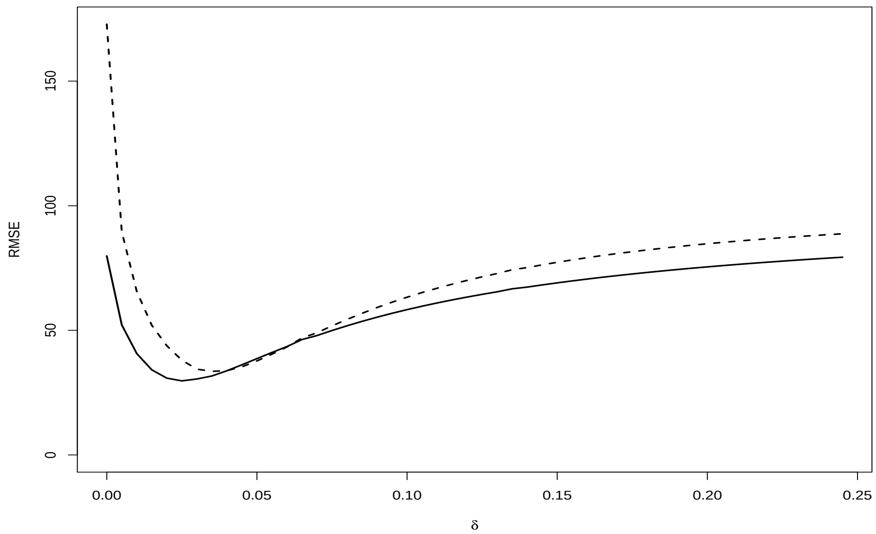

Figure B.145: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$.

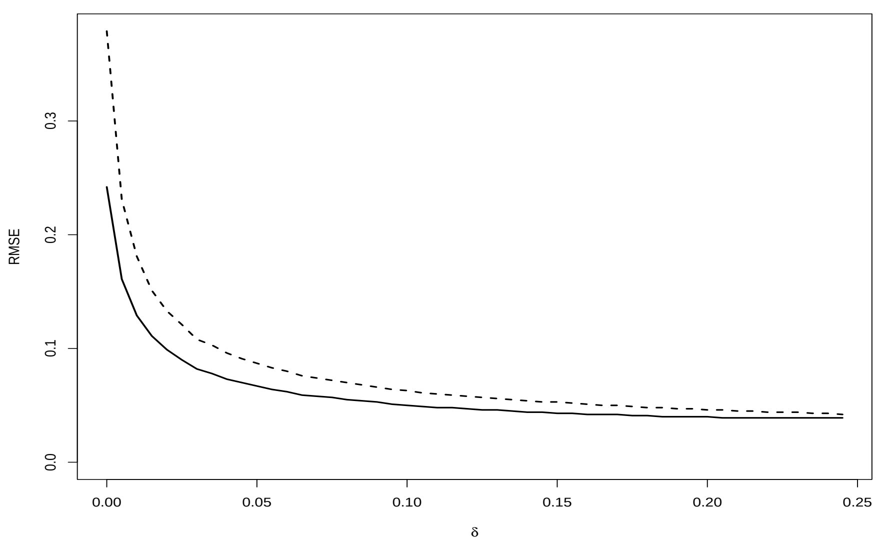

Figure B.146: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = 0$.

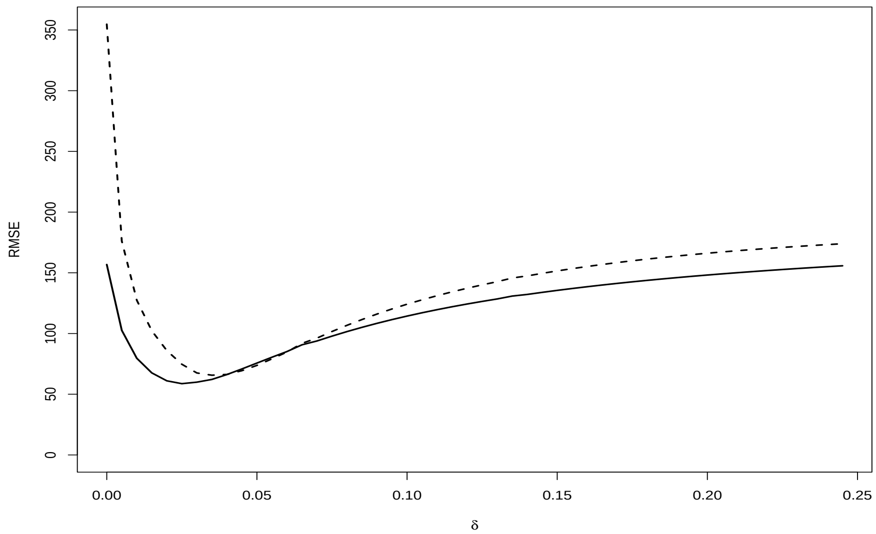

Figure B.147: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$.

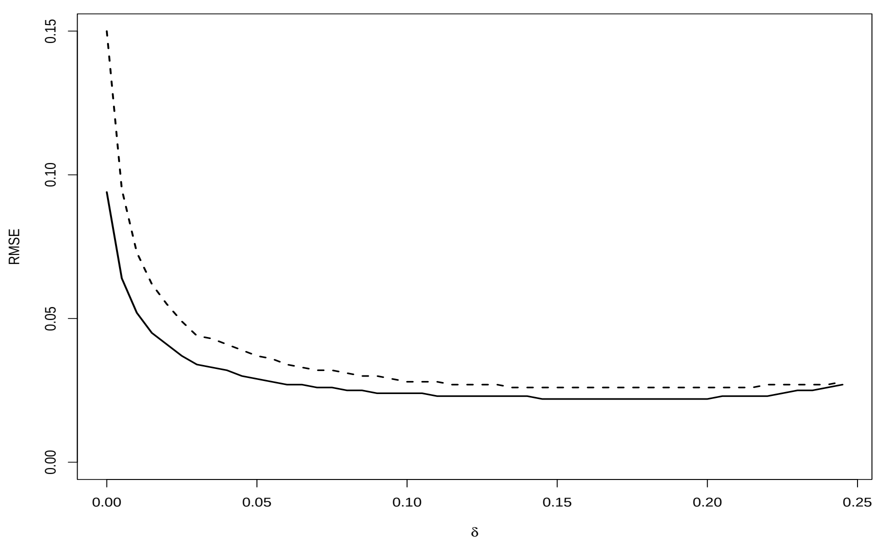

Figure B.148: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = .4$.

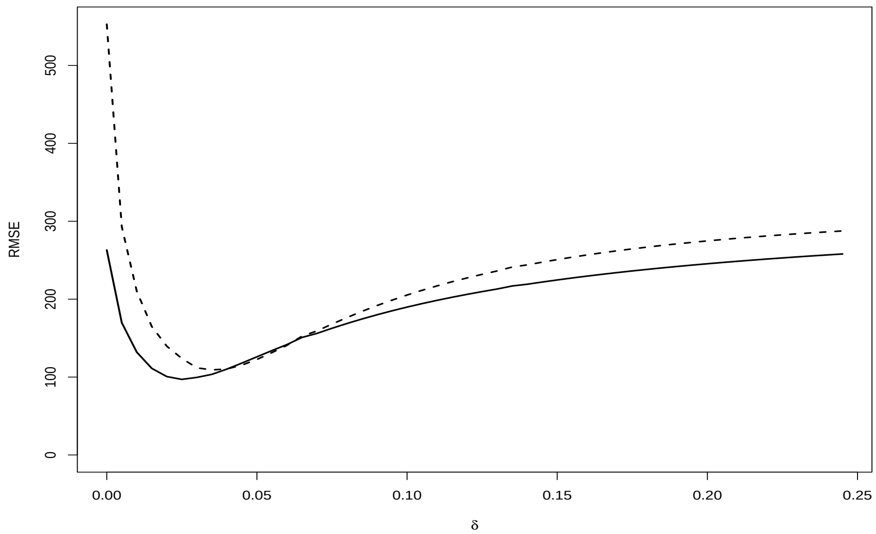

Figure B.149: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$.

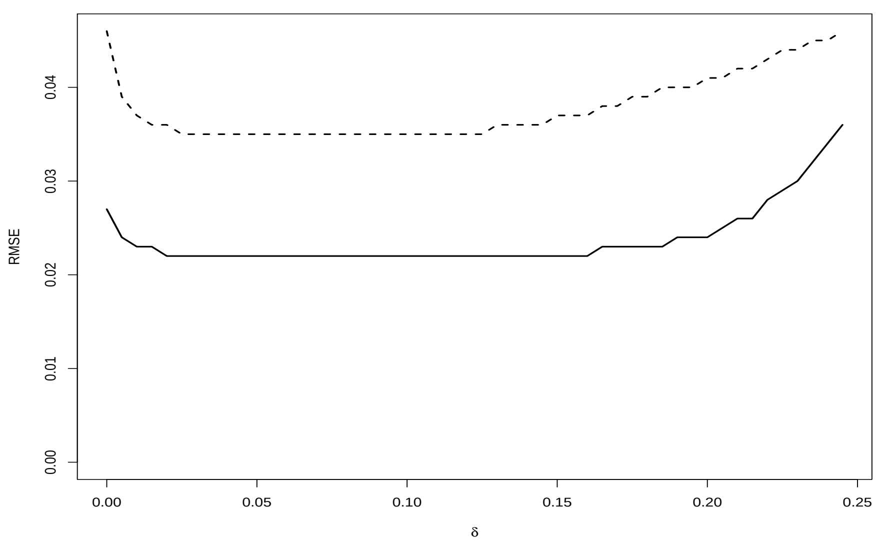

Figure B.150: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Student t ARMA(1,1) process with $\phi = .9$ and $\vartheta = .8$.

B.4 Polynomial Gaussian Process

Results are based on simulations of 25 Polynomial Gaussian processes described in the main paper (also see Appendix A). For the tables, the Local quadratic estimator $\widetilde{f}(\theta)$ is computed via OLS using the data-based optimal bandwidth $\widehat{\delta}_*$, which is determined by using the Flat-top tapered spectral estimator. For the figures, a range of fixed δ values are used, letting this quantity range from .005 to .250 in 50 increments.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.173	0.729	0.750	-0.155	0.469	0.494	-0.060	0.326	0.331
Flat-top taper	-0.288	0.944	0.987	-0.137	0.525	0.543	-0.048	0.335	0.339
Local ($\widehat{\delta}_*$)	-0.033	0.763	0.763	-0.108	0.368	0.384	-0.081	0.232	0.246

Table B.151: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = -.9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-113.524	230.771	257.182	-44.829	216.540	221.132	-24.420	143.799	145.857
Flat-top taper	-52.346	329.871	333.998	14.605	296.447	296.807	13.582	175.792	176.316
Local ($\widehat{\delta}_*$)	-143.816	193.341	240.964	-71.421	181.674	195.209	-33.085	130.645	134.769

Table B.152: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = -.9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.264	0.916	0.954	-0.187	0.588	0.617	-0.078	0.398	0.405
Flat-top taper	-0.528	1.146	1.261	-0.187	0.636	0.663	-0.071	0.415	0.421
Local ($\widehat{\delta}_*$)	-0.089	0.909	0.913	-0.139	0.465	0.485	-0.099	0.295	0.311

Table B.153: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = -.5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-46.382	71.235	85.005	-20.879	73.022	75.948	-10.824	44.755	46.045
Flat-top taper	-29.593	100.244	104.521	-4.221	97.835	97.926	-0.069	52.712	52.712
Local ($\widehat{\delta}_*$)	-55.131	59.498	81.114	-29.248	62.368	68.886	-14.430	41.261	43.711

Table B.154: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = -.5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.549	1.668	1.756	-0.438	1.126	1.208	-0.190	0.771	0.794
Flat-top taper	-0.760	1.832	1.984	-0.421	1.237	1.306	-0.170	0.819	0.837
Local ($\widehat{\delta}_*$)	-0.333	1.484	1.521	-0.271	0.860	0.902	-0.175	0.539	0.567

Table B.155: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-45.613	68.455	82.259	-17.875	70.480	72.711	-9.519	44.613	45.617
Flat-top taper	-29.693	97.344	101.772	-0.811	95.189	95.192	1.356	53.592	53.609
Local ($\widehat{\delta}_*$)	-53.541	57.781	78.773	-26.640	59.227	64.942	-12.913	40.906	42.896

Table B.156: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-3.232	4.429	5.483	-1.763	3.954	4.329	-0.774	2.741	2.848
Flat-top taper	-2.969	5.229	6.013	-1.469	4.421	4.659	-0.612	2.956	3.018
Local ($\widehat{\delta}_*$)	-2.987	4.135	5.101	-2.013	3.481	4.021	-1.163	2.432	2.696

Table B.157: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = .5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-44.843	69.547	82.751	-18.954	67.611	70.217	-10.430	44.261	45.473
Flat-top taper	-29.358	98.367	102.654	-3.197	91.062	91.118	-0.130	53.302	53.302
Local ($\widehat{\delta}_*$)	-52.771	58.970	79.134	-27.510	57.509	63.750	-13.708	40.651	42.900

Table B.158: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = .5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-152.147	51.016	160.472	-78.909	89.849	119.580	-35.495	73.674	81.779
Flat-top taper	-145.228	61.517	157.719	-61.264	107.726	123.928	-19.344	82.721	84.952
Local ($\widehat{\delta}_*$)	-153.018	53.025	161.945	-79.479	91.397	121.121	-36.230	71.312	79.988

Table B.159: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = .9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-46.649	65.335	80.280	-22.773	60.149	64.316	-12.089	38.361	40.220
Flat-top taper	-33.011	90.764	96.581	-9.428	77.075	77.650	-2.937	43.140	43.240
Local ($\widehat{\delta}_*$)	-53.353	56.862	77.973	-30.148	52.839	60.835	-15.756	34.895	38.287

Table B.160: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = .9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.255	0.777	0.818	-0.191	0.526	0.560	-0.076	0.354	0.362
Flat-top taper	-0.403	0.972	1.052	-0.180	0.589	0.616	-0.066	0.382	0.388
Local ($\widehat{\delta}_*$)	-0.086	0.794	0.798	-0.136	0.419	0.441	-0.097	0.265	0.282

Table B.161: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = -.9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-81.203	151.742	172.103	-34.038	144.312	148.272	-17.811	93.357	95.040
Flat-top taper	-42.865	216.975	221.168	3.178	195.205	195.231	6.430	112.089	112.273
Local ($\widehat{\delta}_*$)	-100.438	127.011	161.925	-51.156	122.901	133.122	-23.389	86.344	89.456

Table B.162: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = -.9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.018	1.180	1.180	0.000	0.559	0.559	0.066	0.345	0.352
Flat-top taper	-0.618	1.436	1.564	-0.259	0.692	0.738	0.019	0.288	0.289
Local ($\widehat{\delta}_*$)	0.011	1.085	1.085	-0.019	0.508	0.508	-0.042	0.234	0.238

Table B.163: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = -.5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-3.580	6.593	7.502	-1.792	4.358	4.712	-0.933	2.372	2.549
Flat-top taper	-2.958	7.549	8.108	-1.470	4.814	5.034	-0.662	2.466	2.553
Local ($\widehat{\delta}_*$)	-4.002	6.021	7.230	-2.356	4.120	4.746	-1.132	2.266	2.533

Table B.164: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = -.5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.584	1.701	1.799	0.280	0.973	1.012	0.014	0.430	0.430
Flat-top taper	0.527	1.789	1.865	0.094	1.106	1.110	-0.225	0.480	0.530
Local ($\widehat{\delta}_*$)	-0.135	1.470	1.476	-0.107	0.711	0.719	-0.020	0.389	0.390

Table B.165: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.228	2.336	3.228	-1.638	1.682	2.348	-0.804	0.978	1.266
Flat-top taper	-2.154	2.554	3.341	-1.622	1.733	2.374	-0.936	1.010	1.377
Local ($\widehat{\delta}_*$)	-1.560	2.471	2.922	-1.497	1.417	2.061	-1.075	0.954	1.437

Table B.166: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-3.826	3.425	5.135	-1.848	3.050	3.567	-0.754	1.599	1.768
Flat-top taper	-3.741	3.644	5.222	-1.749	3.096	3.556	-0.848	1.508	1.730
Local ($\widehat{\delta}_*$)	-3.585	3.446	4.973	-2.020	2.710	3.380	-1.070	1.466	1.815

Table B.167: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = .5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.032	2.020	2.268	-0.689	1.258	1.435	-0.459	0.717	0.852
Flat-top taper	-1.031	2.251	2.476	-0.566	1.396	1.506	-0.350	0.676	0.762
Local ($\widehat{\delta}_*$)	-1.751	1.826	2.530	-1.056	1.271	1.653	-0.592	0.656	0.884

Table B.168: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = .5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-151.667	52.216	160.404	-78.181	84.291	114.966	-33.169	73.350	80.501
Flat-top taper	-144.966	62.778	157.975	-60.712	101.157	117.977	-16.925	82.870	84.580
Local ($\widehat{\delta}_*$)	-152.694	53.827	161.904	-78.640	86.501	116.904	-33.840	71.889	79.456

Table B.169: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = .9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.600	2.463	2.535	-0.228	2.061	2.073	-0.114	1.430	1.435
Flat-top taper	-0.249	3.096	3.105	0.010	2.451	2.452	-0.013	1.657	1.657
Local ($\widehat{\delta}_*$)	-0.963	2.276	2.471	-0.627	1.770	1.878	-0.450	1.259	1.337

Table B.170: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = .9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.451	1.061	1.153	-0.325	0.801	0.864	-0.133	0.537	0.553
Flat-top taper	-0.599	1.247	1.383	-0.310	0.893	0.945	-0.116	0.580	0.591
Local ($\widehat{\delta}_*$)	-0.196	1.043	1.061	-0.230	0.611	0.653	-0.148	0.387	0.415

Table B.171: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = -.9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-81.739	149.700	170.562	-29.389	153.770	156.553	-17.983	96.169	97.836
Flat-top taper	-44.158	213.935	218.445	9.471	210.585	210.798	6.281	119.930	120.094
Local ($\widehat{\delta}_*$)	-100.571	125.123	160.531	-47.698	129.271	137.790	-23.894	87.182	90.397

Table B.172: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = -.9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.299	1.519	1.548	-0.026	0.655	0.656	0.066	0.387	0.392
Flat-top taper	-0.033	1.721	1.721	-0.430	0.751	0.866	0.018	0.369	0.369
Local ($\widehat{\delta}_*$)	-0.099	1.222	1.226	-0.029	0.592	0.593	-0.024	0.300	0.301

Table B.173: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = -.5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-3.165	4.830	5.775	-1.708	3.046	3.492	-0.793	1.720	1.894
Flat-top taper	-2.846	5.434	6.135	-1.660	3.244	3.644	-0.720	1.778	1.919
Local ($\widehat{\delta}_*$)	-2.944	4.291	5.204	-2.201	2.844	3.597	-1.012	1.664	1.948

Table B.174: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = -.5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.023	1.549	1.549	0.003	0.787	0.787	-0.001	0.386	0.386
Flat-top taper	-0.013	1.573	1.573	0.008	0.795	0.795	0.000	0.387	0.387
Local ($\widehat{\delta}_*$)	0.029	1.717	1.717	0.015	0.845	0.845	0.003	0.418	0.418

Table B.175: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-0.049	1.552	1.553	-0.020	0.781	0.781	-0.005	0.384	0.384
Flat-top taper	-0.048	1.596	1.597	-0.021	0.790	0.791	-0.006	0.386	0.386
Local ($\widehat{\delta}_*$)	0.012	1.700	1.700	-0.001	0.855	0.855	-0.001	0.420	0.420

Table B.176: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-3.967	4.067	5.681	-1.779	2.915	3.414	-0.777	1.715	1.882
Flat-top taper	-3.884	4.293	5.789	-1.941	3.017	3.587	-0.828	1.729	1.917
Local ($\widehat{\delta}_*$)	-3.412	3.696	5.030	-2.364	2.743	3.621	-1.061	1.639	1.952

Table B.177: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = .5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.737	1.604	1.765	0.058	0.636	0.639	0.110	0.398	0.413
Flat-top taper	0.437	1.850	1.900	-0.411	0.735	0.842	0.032	0.375	0.376
Local ($\widehat{\delta}_*$)	-0.157	1.090	1.101	-0.020	0.599	0.599	-0.022	0.302	0.302

Table B.178: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = .5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-152.308	51.667	160.833	-76.186	89.784	117.752	-33.220	73.593	80.744
Flat-top taper	-145.472	62.147	158.191	-57.755	109.425	123.731	-16.690	83.650	85.299
Local ($\widehat{\delta}_*$)	-153.369	53.126	162.310	-76.478	92.745	120.211	-33.663	72.351	79.798

Table B.179: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = .9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.126	1.202	1.209	0.011	0.821	0.821	0.000	0.538	0.538
Flat-top taper	-0.085	1.489	1.491	0.041	0.948	0.949	0.016	0.598	0.599
Local ($\widehat{\delta}_*$)	-0.017	1.093	1.093	-0.072	0.631	0.635	-0.080	0.385	0.393

Table B.180: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = .9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.789	2.342	2.947	-1.109	2.121	2.394	-0.473	1.520	1.592
Flat-top taper	-1.821	2.835	3.369	-0.998	2.387	2.587	-0.392	1.638	1.684
Local ($\widehat{\delta}_*$)	-1.580	2.046	2.585	-1.265	1.771	2.176	-0.713	1.278	1.463

Table B.181: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = -.9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-81.313	149.288	169.996	-32.208	147.333	150.813	-18.219	89.735	91.566
Flat-top taper	-44.323	211.711	216.301	5.118	200.064	200.129	5.535	108.694	108.835
Local ($\widehat{\delta}_*$)	-100.251	124.899	160.156	-50.138	123.889	133.650	-23.790	82.464	85.827

Table B.182: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = -.9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.169	1.915	2.243	-0.753	1.249	1.459	-0.435	0.737	0.856
Flat-top taper	-1.202	2.104	2.423	-0.683	1.345	1.509	-0.386	0.665	0.769
Local ($\widehat{\delta}_*$)	-1.911	1.744	2.588	-1.075	1.231	1.634	-0.602	0.653	0.888

Table B.183: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = -.5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n=50$			$n=200$			$n=800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-3.375	4.244	5.422	-1.727	3.059	3.512	-0.814	1.554	1.754
Flat-top taper	-3.183	4.776	5.739	-1.514	3.213	3.551	-0.801	1.501	1.701
Local ($\widehat{\delta}_*$)	-3.061	4.031	5.061	-1.915	2.750	3.351	-1.062	1.446	1.794

Table B.184: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = -.5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-2.444	2.091	3.217	-1.726	1.736	2.448	-0.739	0.987	1.233
Flat-top taper	-2.412	2.181	3.251	-1.774	1.710	2.464	-0.982	1.001	1.402
Local ($\widehat{\delta}_*$)	-1.782	2.242	2.864	-1.530	1.431	2.095	-1.104	0.960	1.463

Table B.185: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.590	1.617	1.721	0.384	0.957	1.031	0.022	0.412	0.413
Flat-top taper	0.538	1.710	1.792	0.217	1.104	1.125	-0.234	0.462	0.518
Local ($\widehat{\delta}_*$)	-0.170	1.416	1.426	-0.131	0.706	0.718	-0.033	0.383	0.385

Table B.186: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-4.614	5.717	7.347	-2.013	4.097	4.565	-0.871	2.432	2.583
Flat-top taper	-4.450	6.059	7.518	-1.977	4.376	4.802	-0.753	2.468	2.580
Local ($\widehat{\delta}_*$)	-4.798	5.103	7.005	-2.614	3.944	4.732	-1.124	2.307	2.566

Table B.187: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = .5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.428	1.392	1.456	0.107	0.576	0.586	0.127	0.414	0.433
Flat-top taper	-0.274	1.664	1.686	-0.254	0.723	0.767	0.042	0.295	0.298
Local ($\widehat{\delta}_*$)	0.010	1.033	1.033	-0.002	0.513	0.513	-0.037	0.237	0.240

Table B.188: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = .5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-153.046	53.434	162.106	-80.036	86.629	117.942	-34.662	73.304	81.086
Flat-top taper	-145.864	64.404	159.450	-62.173	104.438	121.543	-18.293	82.874	84.869
Local ($\widehat{\delta}_*$)	-154.136	55.109	163.692	-80.544	88.703	119.815	-35.440	71.653	79.939

Table B.189: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = .9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.190	1.060	1.077	0.030	0.537	0.538	0.010	0.354	0.354
Flat-top taper	-0.085	1.228	1.231	0.048	0.632	0.633	0.019	0.382	0.382
Local ($\widehat{\delta}_*$)	0.062	0.833	0.836	-0.031	0.433	0.434	-0.048	0.259	0.263

Table B.190: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = .9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-77.499	23.095	80.867	-42.870	40.243	58.799	-18.598	36.026	40.543
Flat-top taper	-74.994	27.855	80.000	-36.234	47.197	59.502	-12.134	38.856	40.707
Local ($\widehat{\delta}_*$)	-78.615	23.248	81.980	-44.679	39.732	59.790	-20.288	33.587	39.239

Table B.191: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = -.9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-84.056	143.064	165.930	-35.508	143.534	147.861	-19.627	91.017	93.109
Flat-top taper	-49.534	200.729	206.750	-0.505	193.488	193.489	3.687	109.796	109.858
Local ($\widehat{\delta}_*$)	-101.627	120.677	157.769	-52.130	122.720	133.333	-25.371	82.360	86.179

Table B.192: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = -.9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-78.547	22.592	81.731	-39.723	41.715	57.602	-16.830	34.570	38.449
Flat-top taper	-76.544	26.616	81.039	-32.665	50.128	59.832	-9.984	38.516	39.790
Local ($\widehat{\delta}_*$)	-79.811	22.856	83.019	-41.271	42.571	59.292	-18.259	33.357	38.028

Table B.193: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = -.5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-1.879	4.663	5.027	-0.549	3.908	3.946	-0.255	2.591	2.604
Flat-top taper	-1.106	5.561	5.670	-0.038	4.606	4.606	-0.038	2.959	2.960
Local ($\widehat{\delta}_*$)	-2.297	4.474	5.029	-1.127	3.526	3.702	-0.783	2.350	2.477

Table B.194: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = -.5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-78.398	24.597	82.166	-39.408	42.453	57.924	-16.483	35.368	39.020
Flat-top taper	-76.004	29.257	81.440	-31.615	51.320	60.277	-9.066	39.849	40.867
Local ($\widehat{\delta}_*$)	-79.125	25.032	82.990	-40.576	43.862	59.752	-17.580	34.492	38.714

Table B.195: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.283	1.909	1.930	-0.042	1.103	1.104	-0.005	0.742	0.742
Flat-top taper	0.022	2.226	2.226	-0.010	1.281	1.281	0.020	0.843	0.843
Local ($\widehat{\delta}_*$)	-0.202	1.528	1.541	-0.115	0.903	0.910	-0.095	0.543	0.551

Table B.196: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = 0$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-80.315	26.053	84.435	-41.413	42.586	59.402	-18.026	37.101	41.248
Flat-top taper	-77.497	30.950	83.449	-33.548	50.956	61.008	-10.677	41.521	42.872
Local ($\widehat{\delta}_*$)	-81.610	26.518	85.811	-42.853	43.394	60.987	-19.331	36.203	41.041

Table B.197: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = .5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.157	1.069	1.081	0.018	0.601	0.602	0.002	0.383	0.383
Flat-top taper	-0.335	1.338	1.379	0.011	0.675	0.675	0.006	0.418	0.418
Local ($\widehat{\delta}_*$)	0.019	0.960	0.960	-0.044	0.484	0.486	-0.060	0.292	0.298

Table B.198: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = .5$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	-224.050	80.429	238.049	-115.115	130.474	173.997	-50.252	109.942	120.883
Flat-top taper	-211.743	97.572	233.143	-86.411	158.591	180.605	-24.354	124.951	127.302
Local ($\widehat{\delta}_*$)	-224.588	83.583	239.637	-114.394	134.623	176.662	-50.342	106.897	118.158

Table B.199: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = 0$, for a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = .9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

	$n = 50$			$n = 200$			$n = 800$		
Method	Bias	SD	RMSE	Bias	SD	RMSE	Bias	SD	RMSE
Parzen taper	0.220	0.995	1.019	0.062	0.623	0.626	0.011	0.316	0.316
Flat-top taper	0.084	1.148	1.151	0.091	0.584	0.591	0.023	0.335	0.336
Local ($\widehat{\delta}_*$)	0.112	0.786	0.794	-0.001	0.387	0.387	-0.041	0.226	0.229

Table B.200: Bias, Standard Deviation, and Root MSE for spectral density estimators at frequency $\theta = \pi$, for a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = .9$. Sample size is $n = 50, 200, 800$. Flat-top tapered estimation and Parzen-taper estimation are considered, with optimal bandwidth choices. Local quadratic spectral estimation is considered with estimated optimal window $\widehat{\delta}_*$.

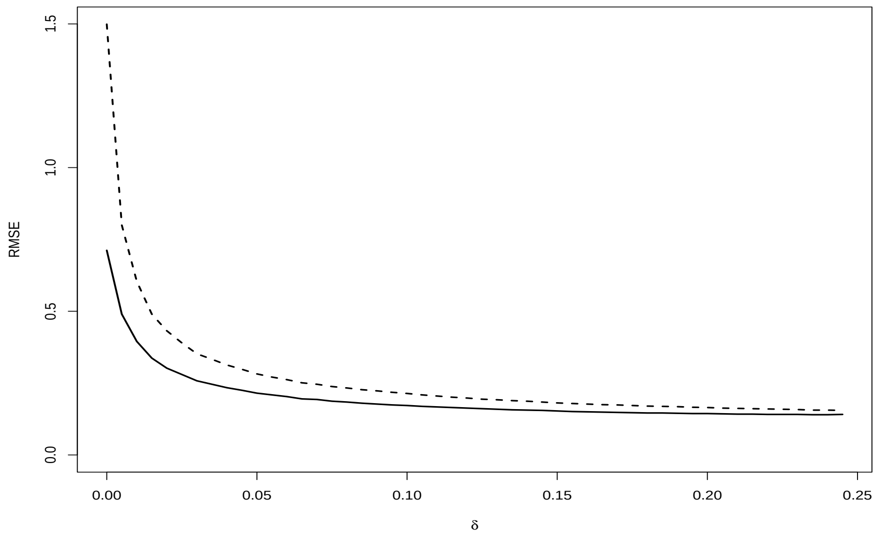

Figure B.151: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = -.9$.

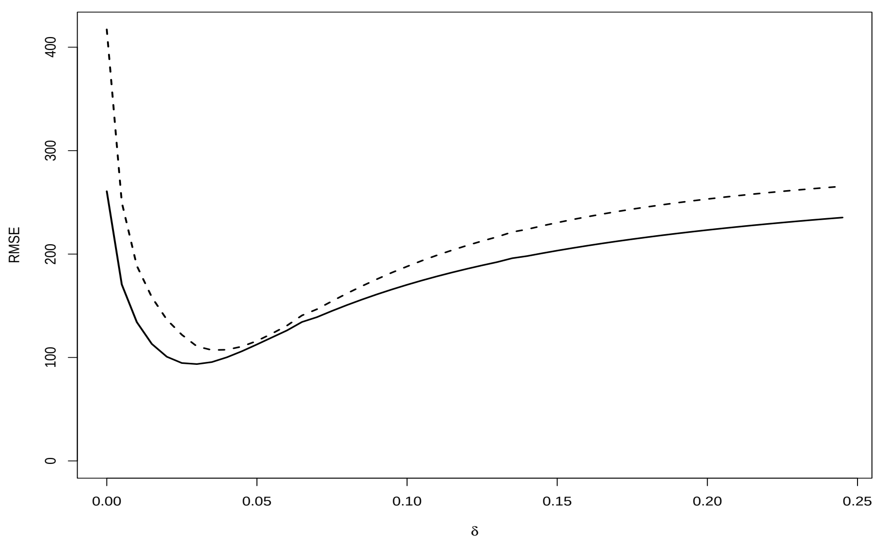

Figure B.152: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = -.9$.

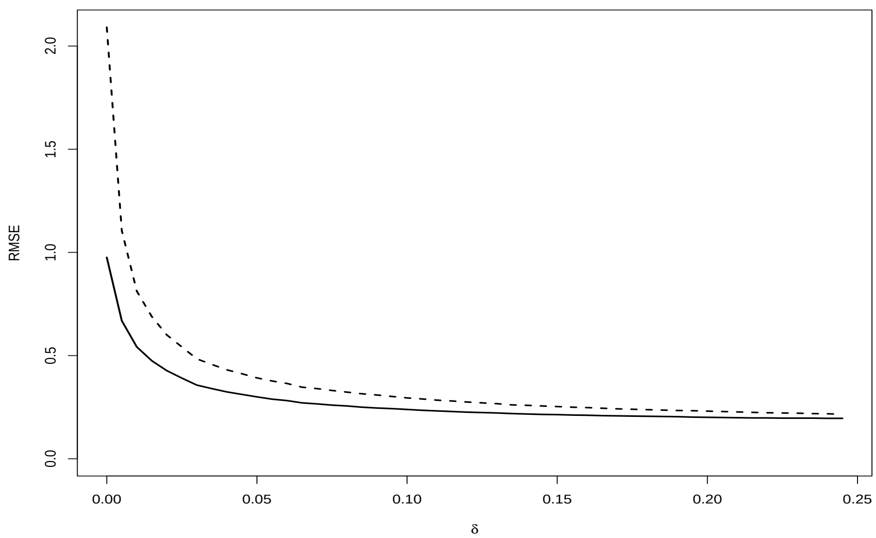

Figure B.153: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = -.5$.

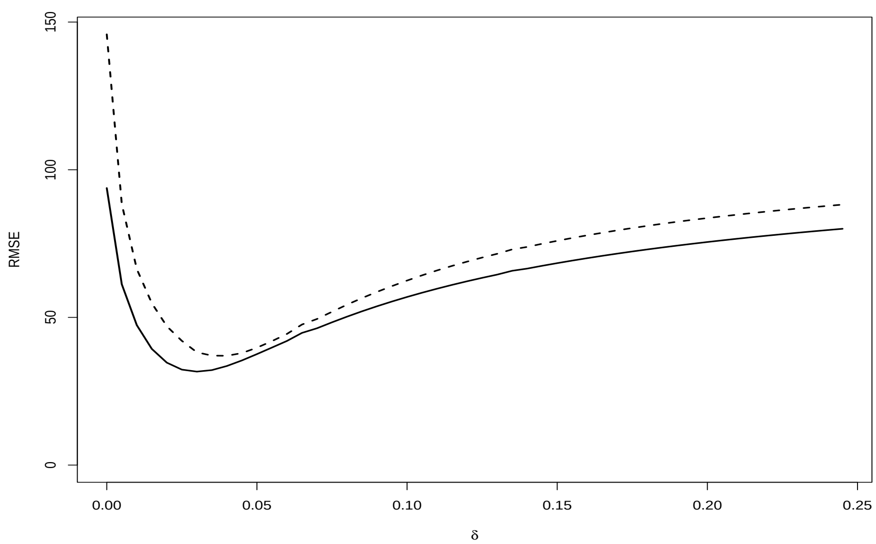

Figure B.154: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = -.5$.

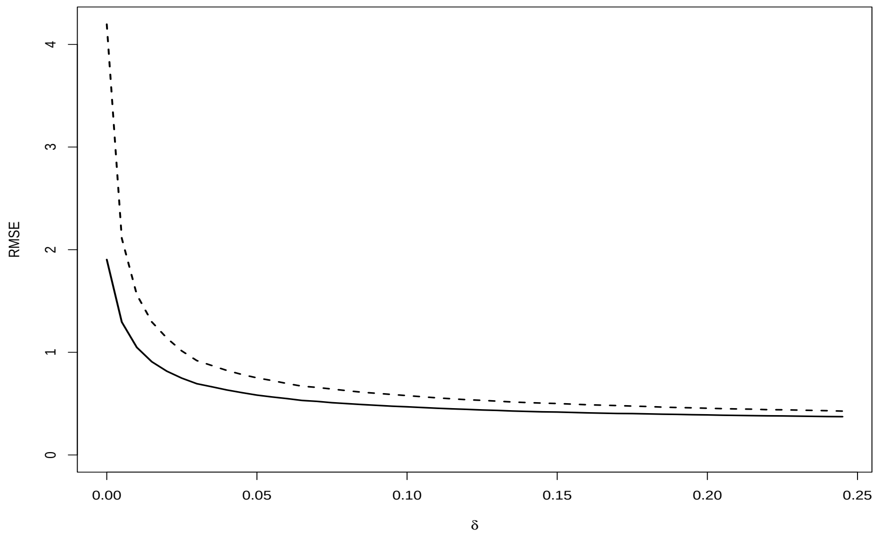

Figure B.155: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = 0$.

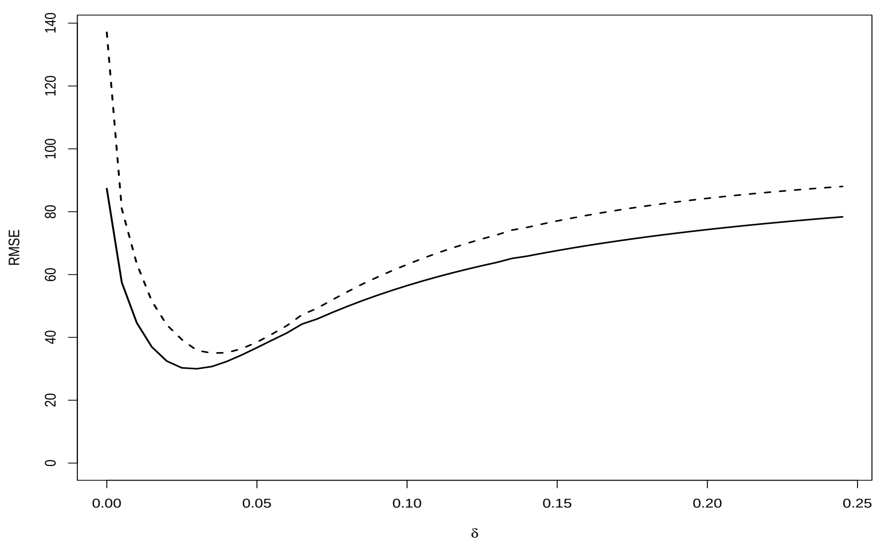

Figure B.156: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = 0$.

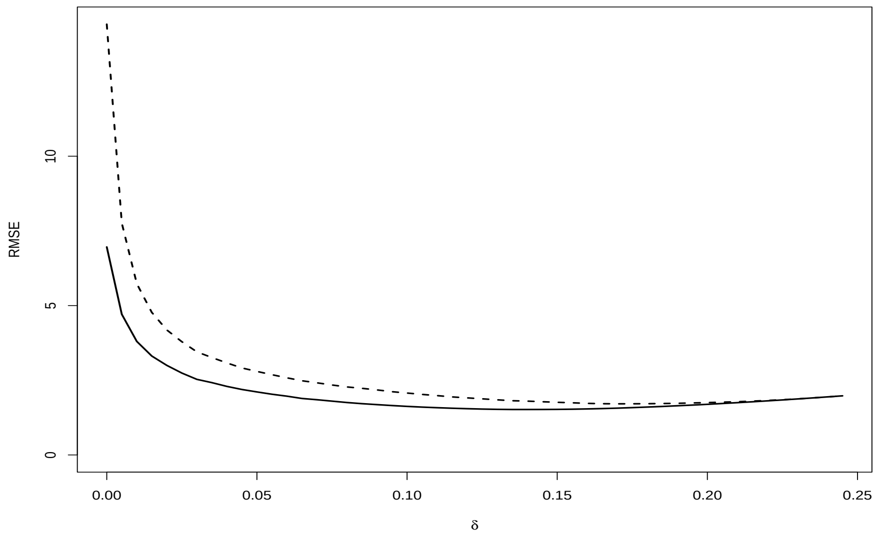

Figure B.157: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = .5$.

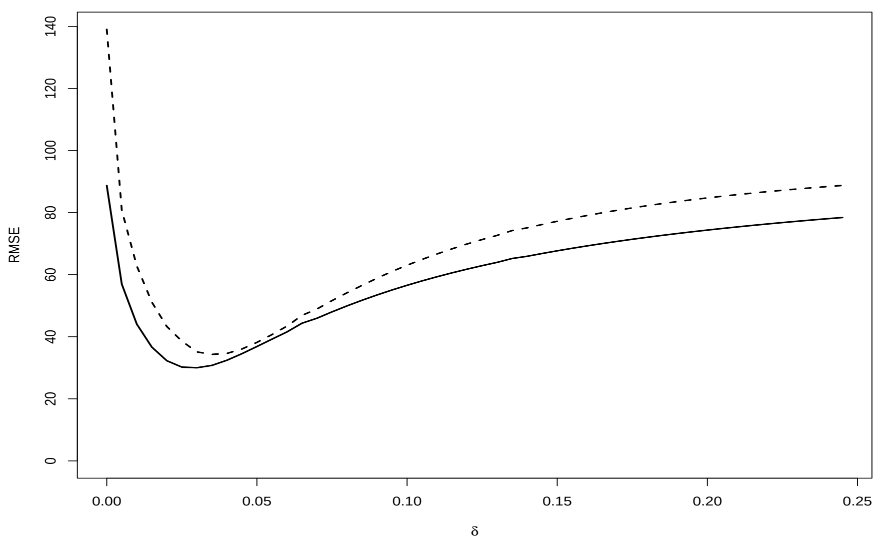

Figure B.158: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = .5$.

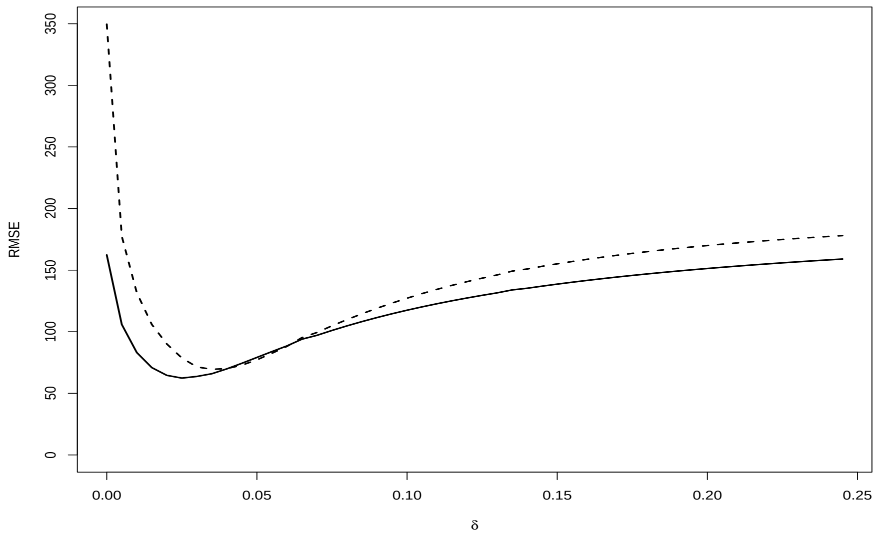

Figure B.159: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = .9$.

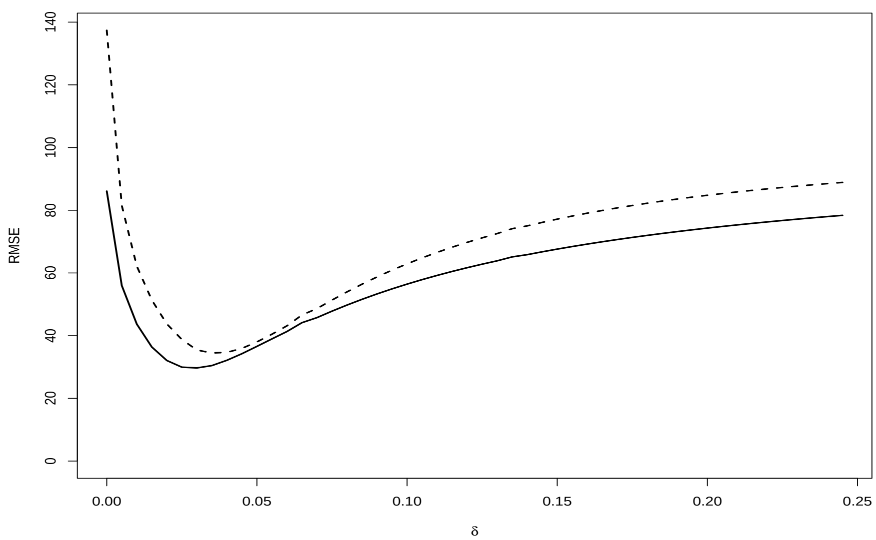

Figure B.160: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.9$ and $\phi_2 = .9$.

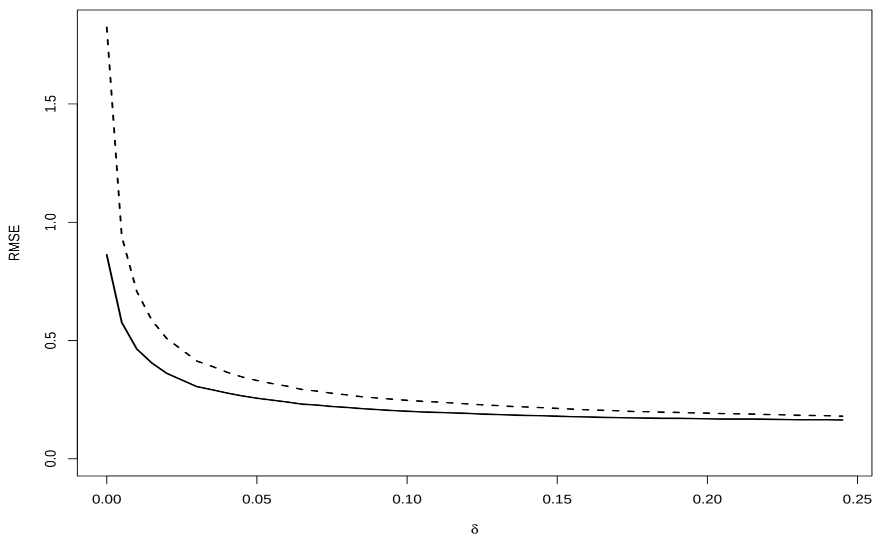

Figure B.161: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = -.9$.

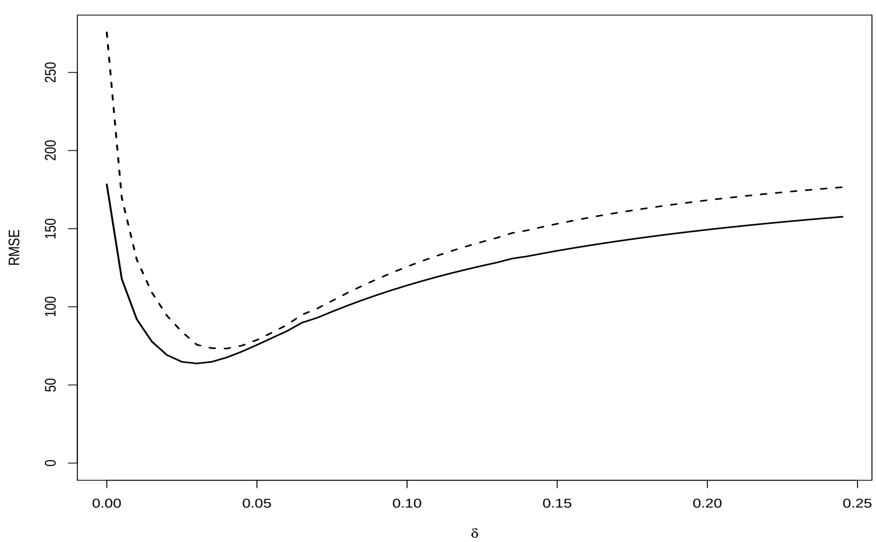

Figure B.162: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = -.9$.

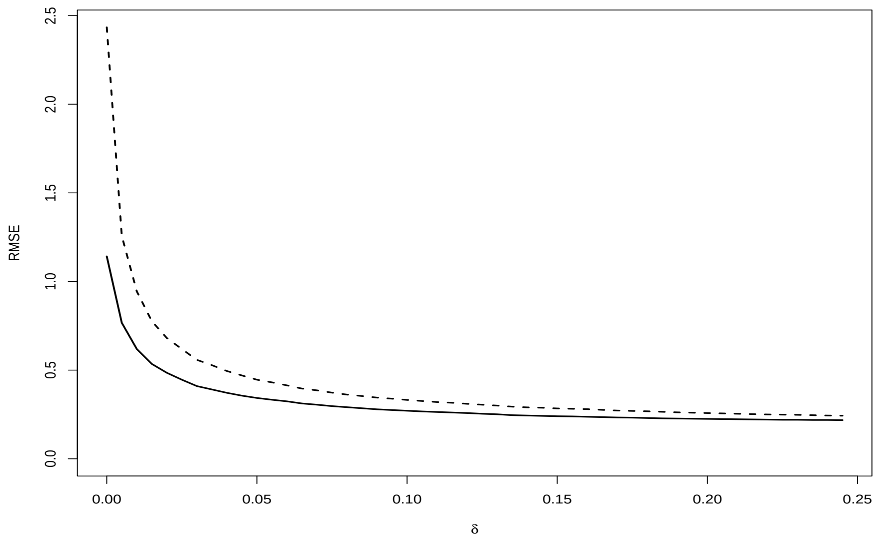

Figure B.163: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = -.5$.

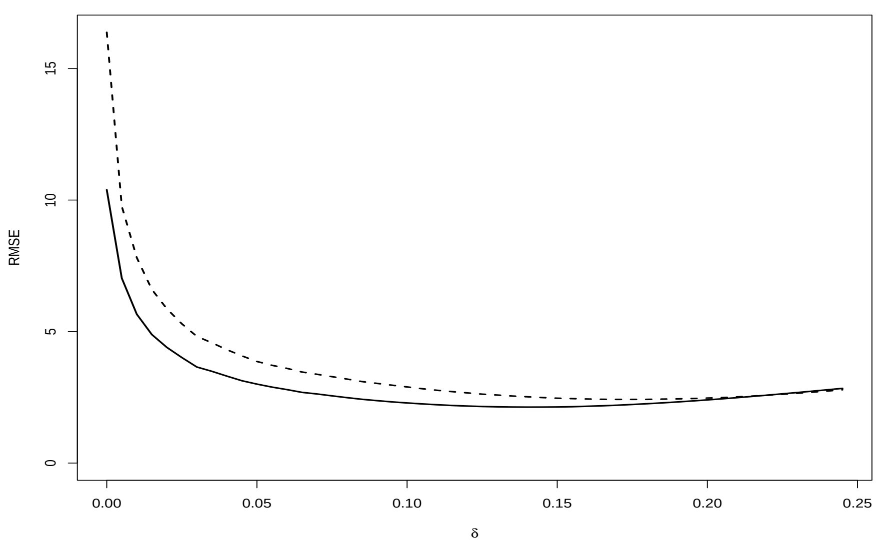

Figure B.164: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = -.5$.

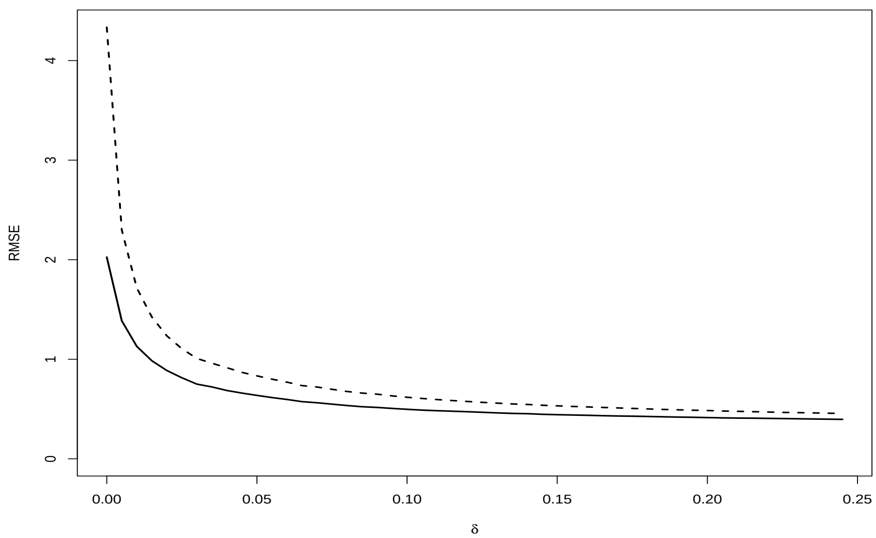

Figure B.165: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = 0$.

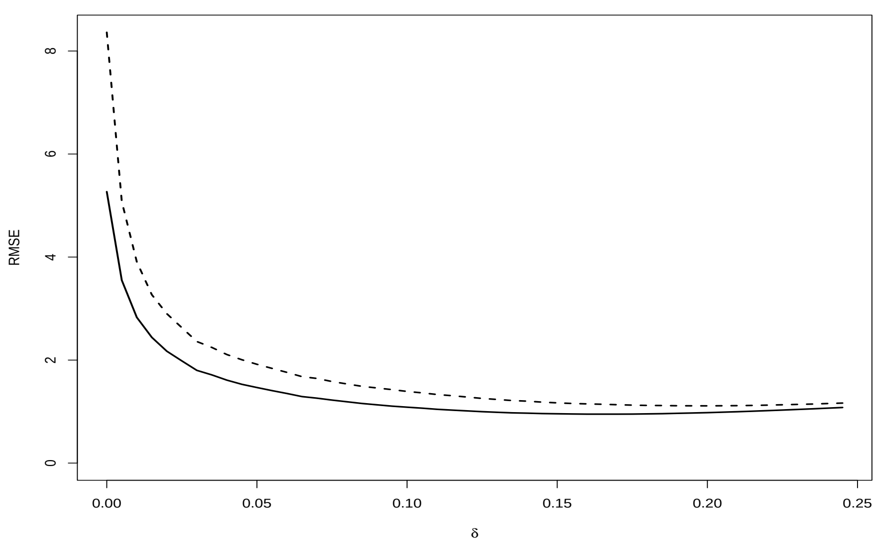

Figure B.166: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = 0$.

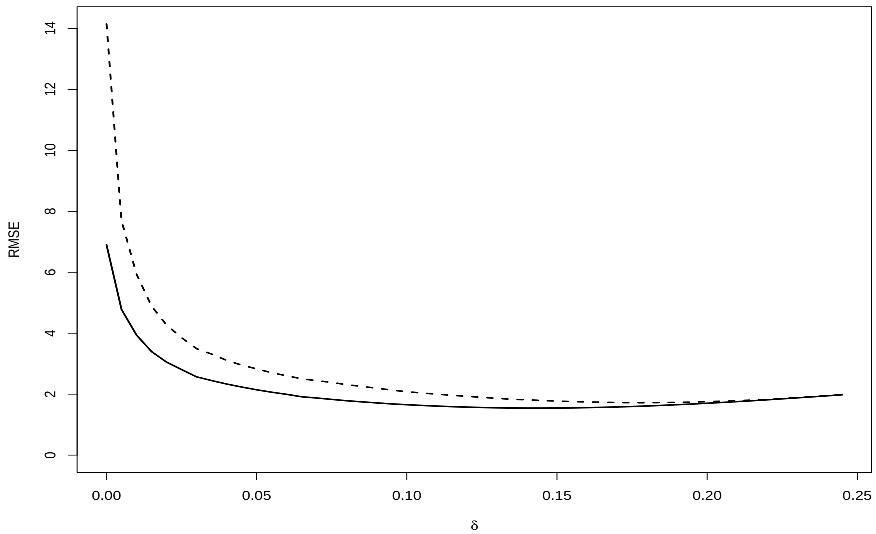

Figure B.167: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = .5$.

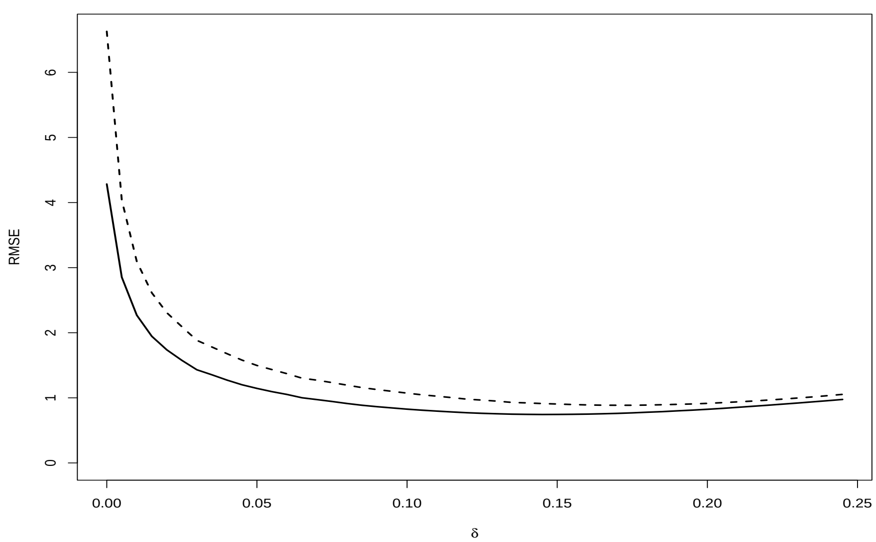

Figure B.168: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = .5$.

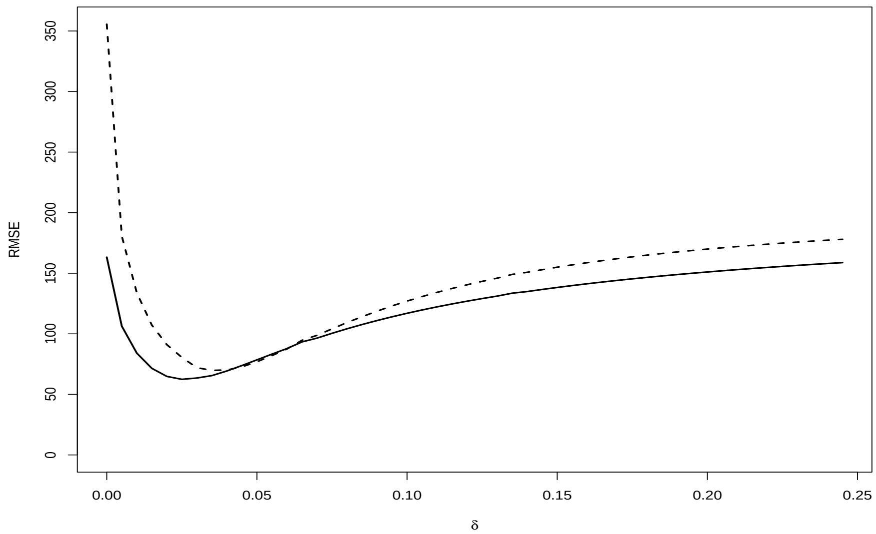

Figure B.169: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = .9$.

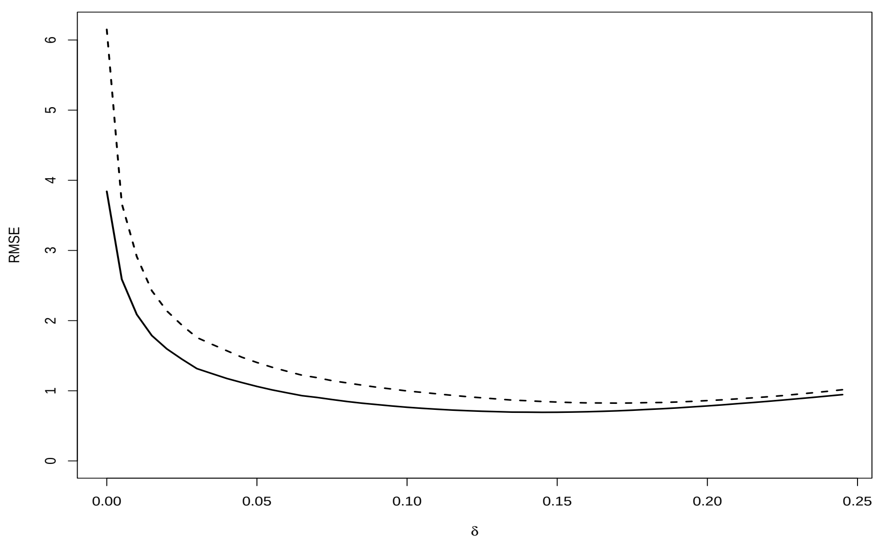

Figure B.170: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = -.5$ and $\phi_2 = .9$.

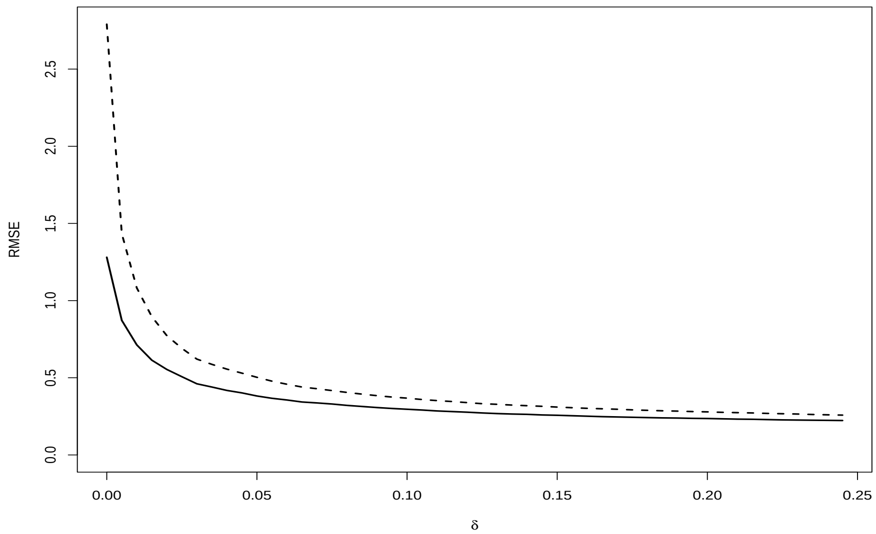

Figure B.171: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = -.9$.

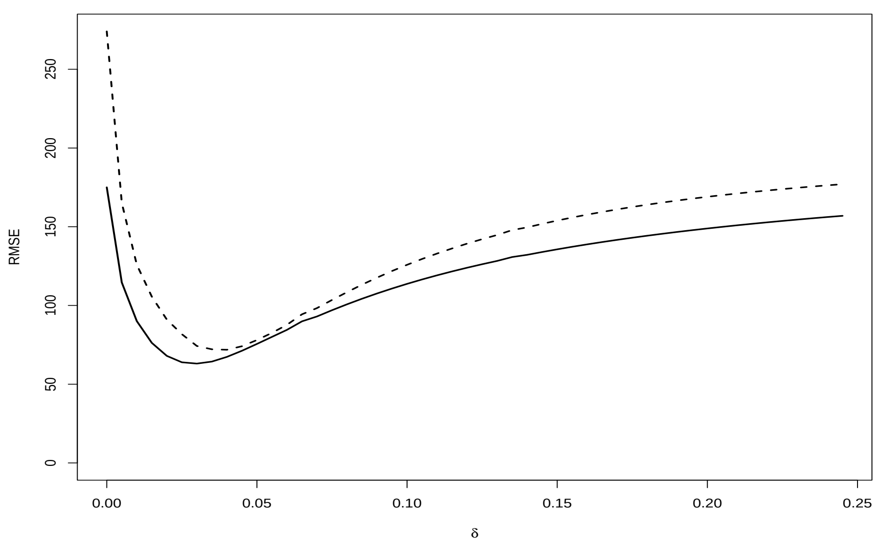

Figure B.172: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = -.9$.

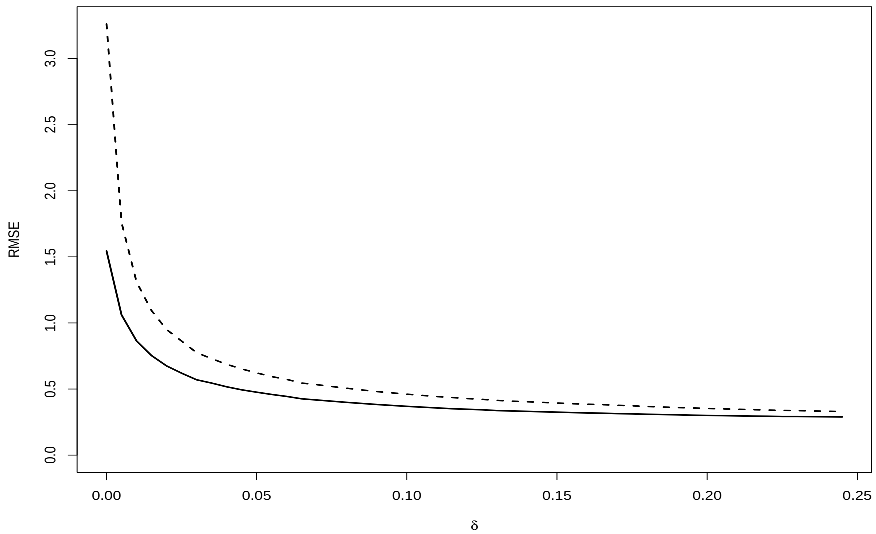

Figure B.173: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = -.5$.

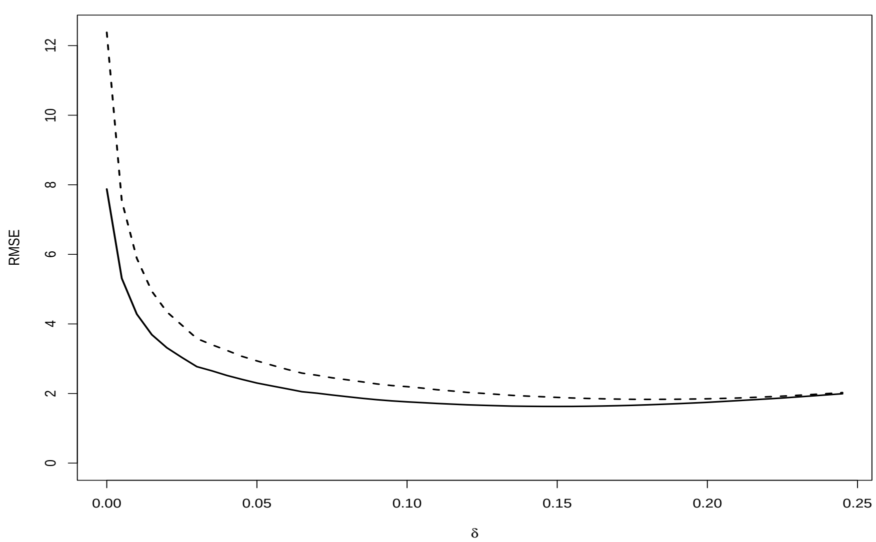

Figure B.174: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = -.5$.

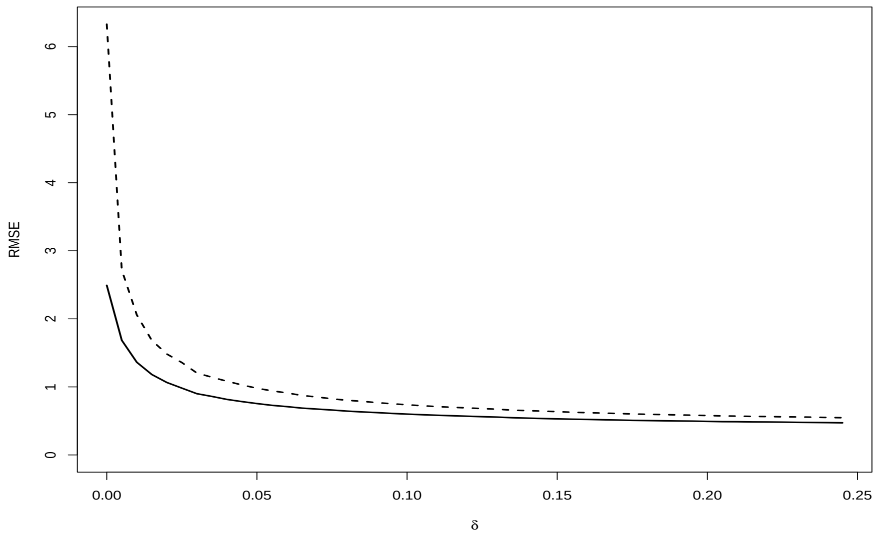

Figure B.175: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = 0$.

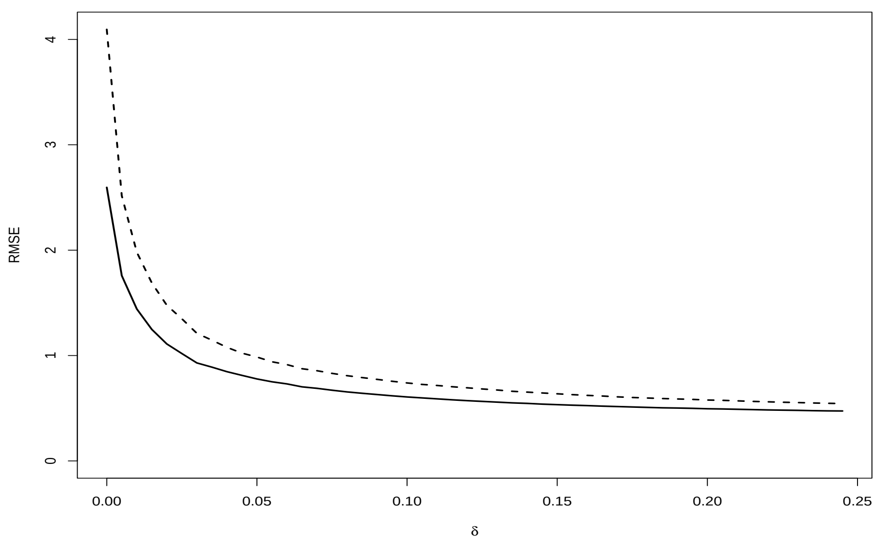

Figure B.176: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = 0$.

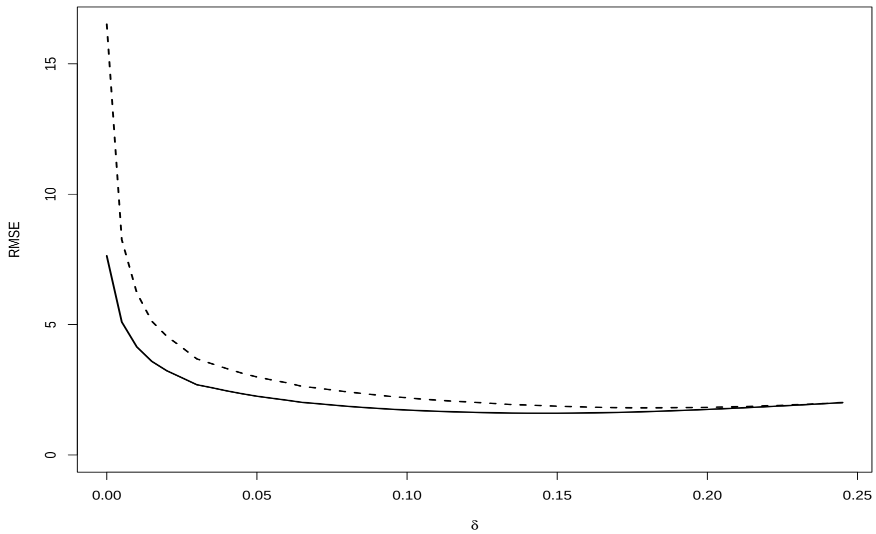

Figure B.177: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = .5$.

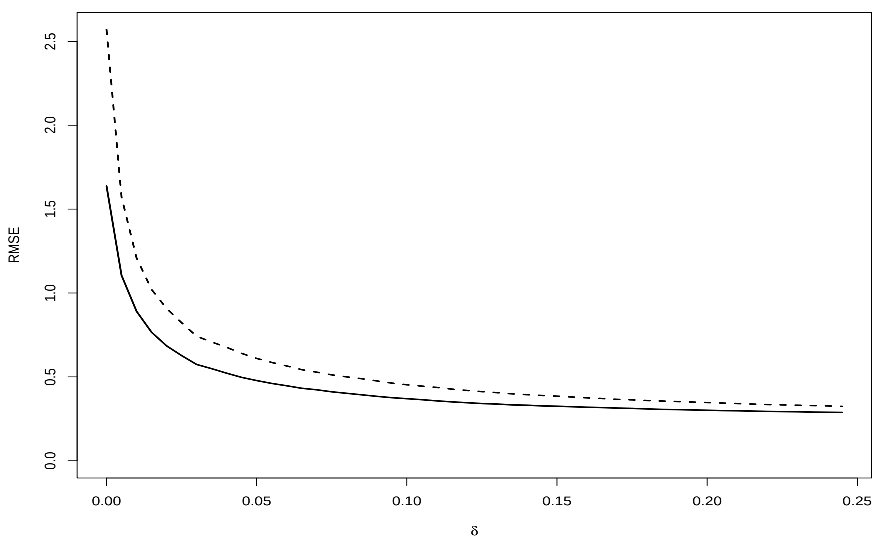

Figure B.178: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = .5$.

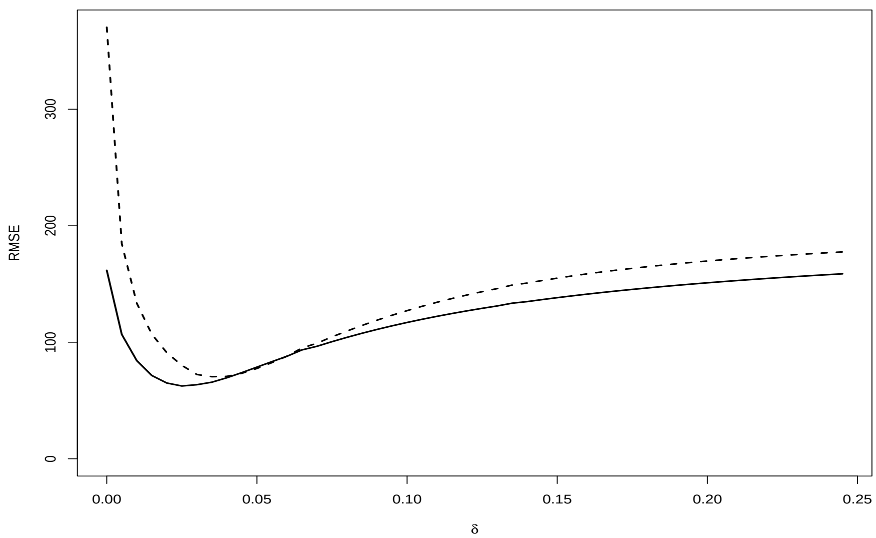

Figure B.179: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = .9$.

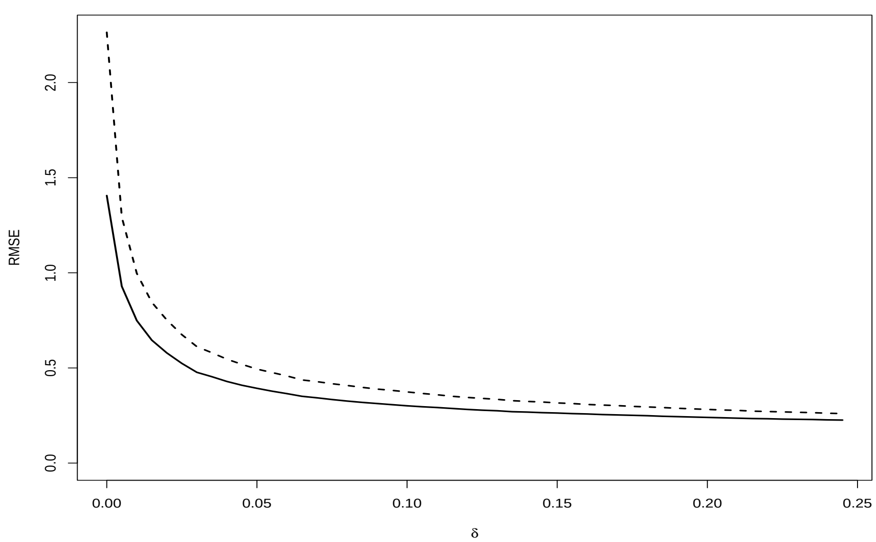

Figure B.180: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = 0$ and $\phi_2 = .9$.

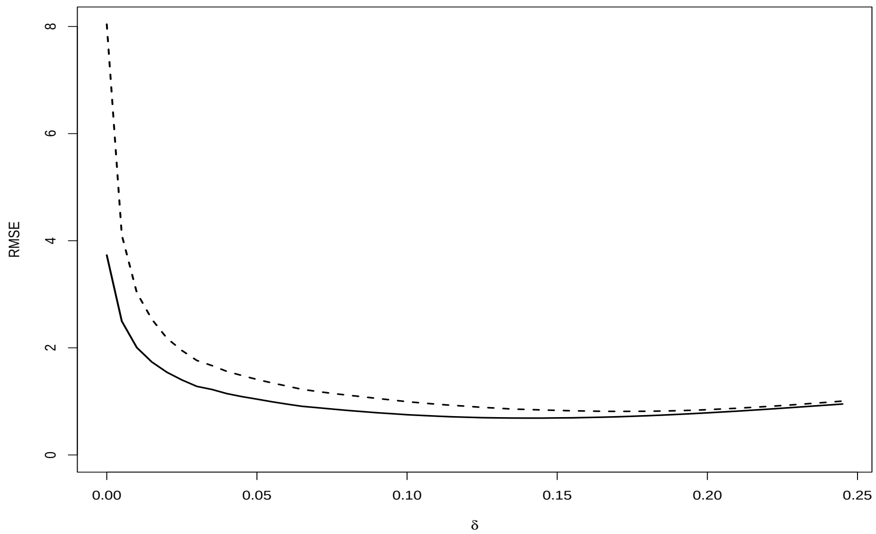

Figure B.181: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = -.9$.

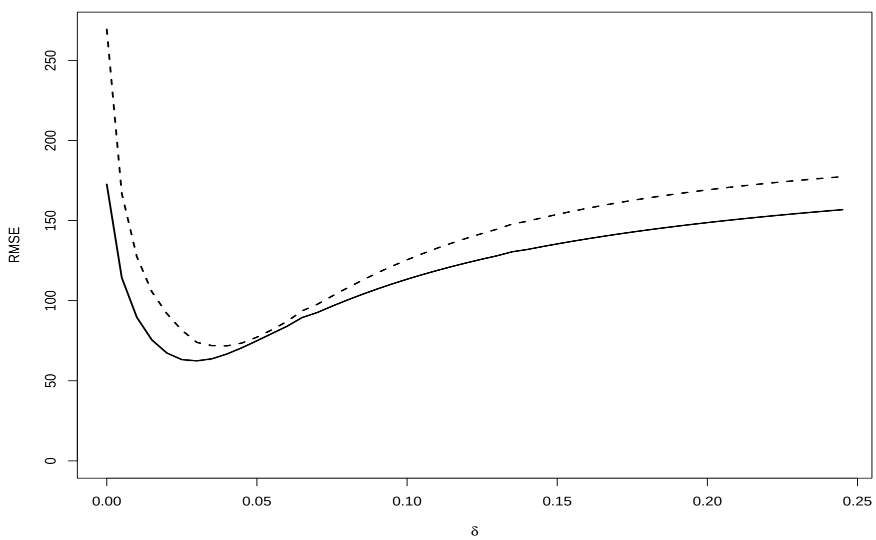

Figure B.182: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = -.9$.

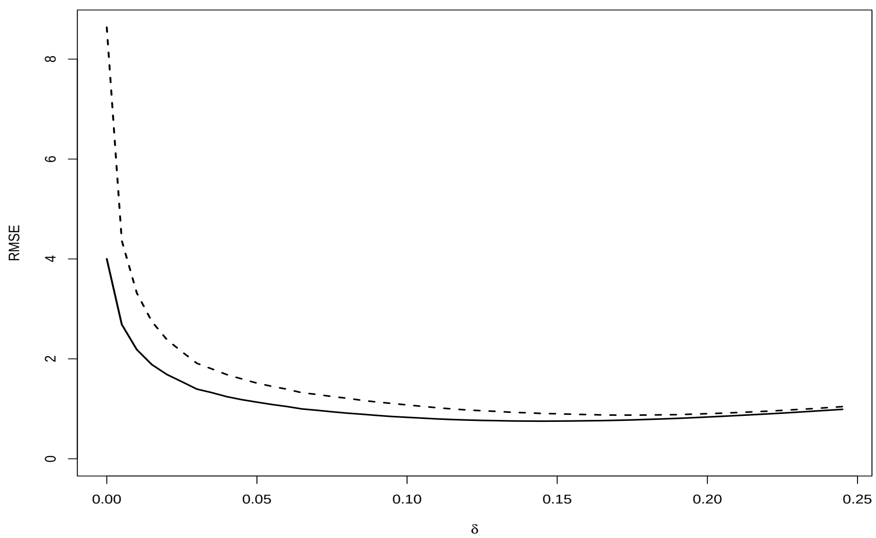

Figure B.183: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = -.5$.

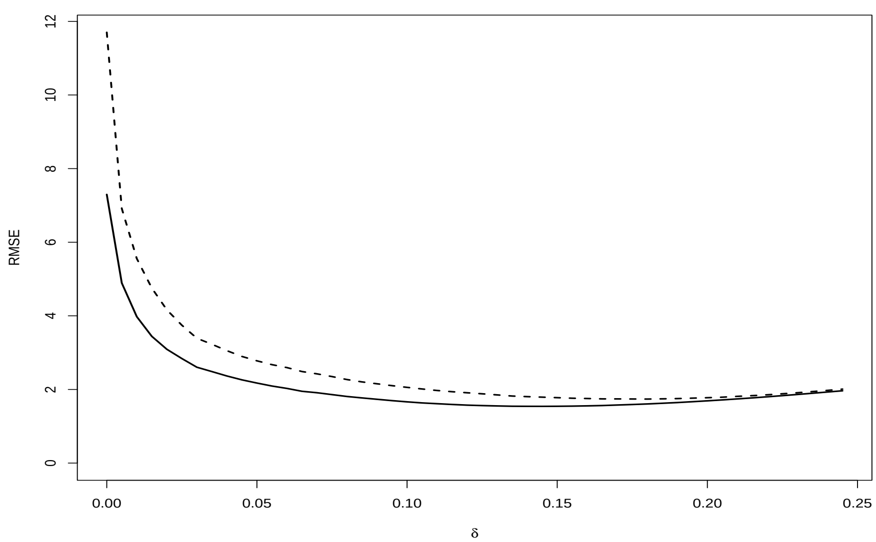

Figure B.184: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = -.5$.

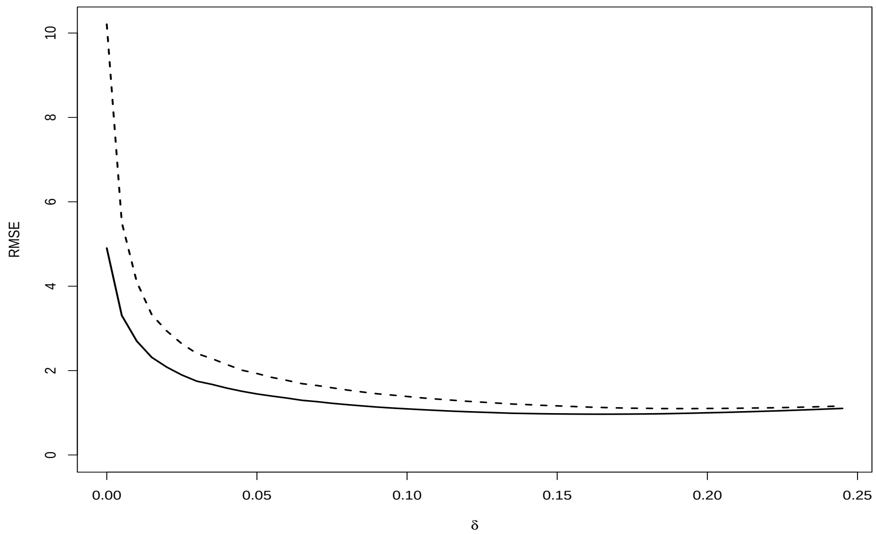

Figure B.185: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = 0$.

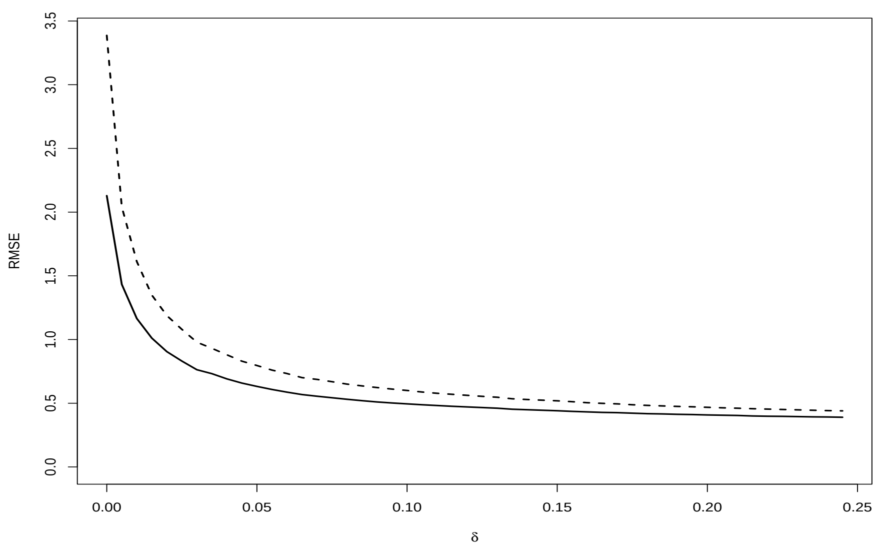

Figure B.186: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = 0$.

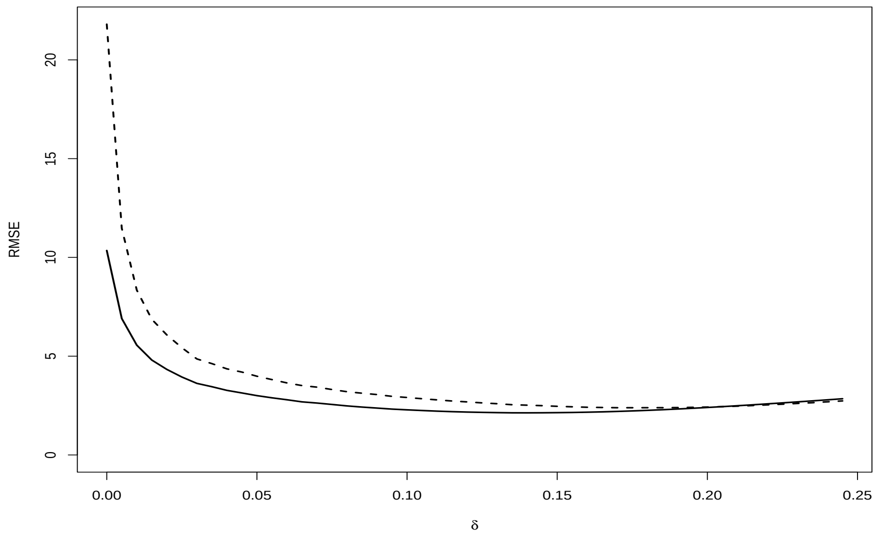

Figure B.187: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = .5$.

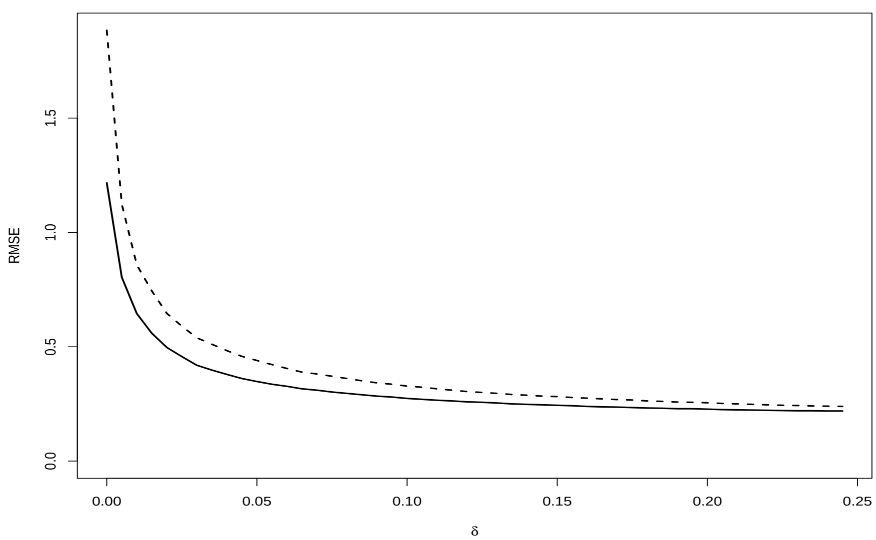

Figure B.188: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = .5$.

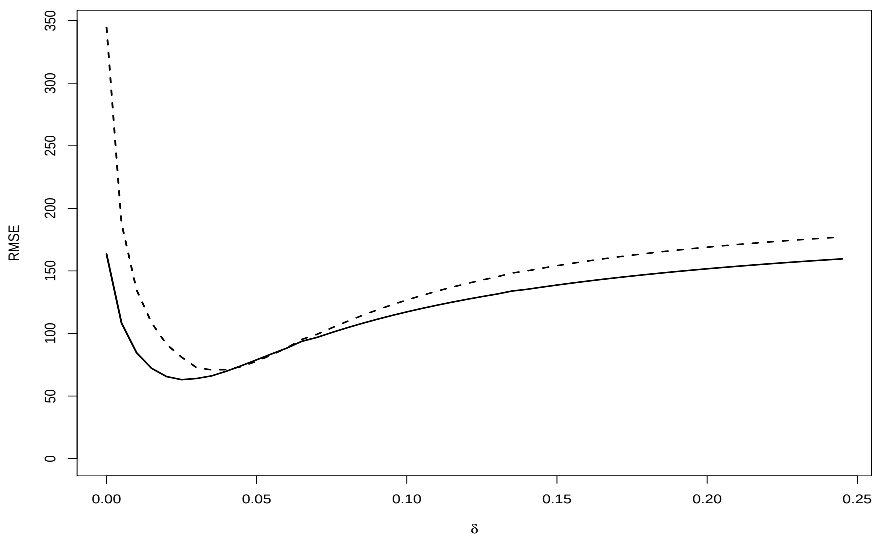

Figure B.189: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = .9$.

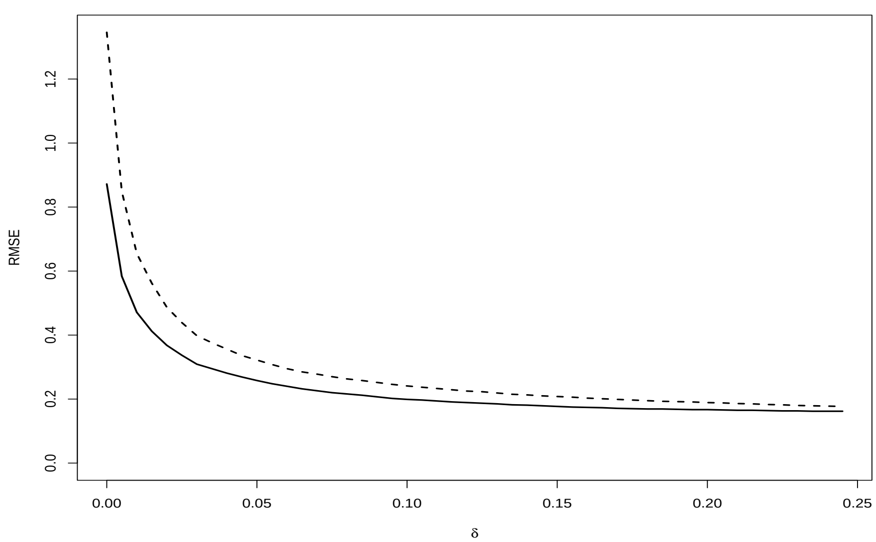

Figure B.190: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .5$ and $\phi_2 = .9$.

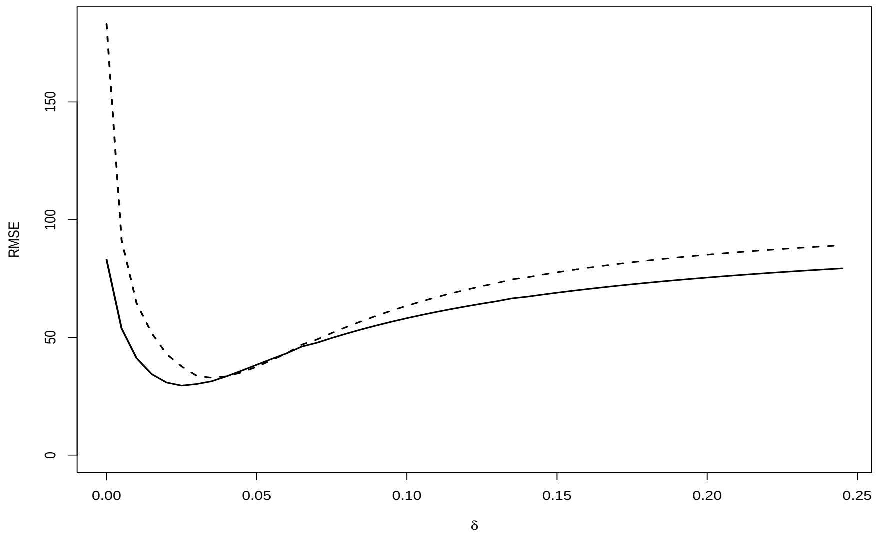

Figure B.191: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = -.9$.

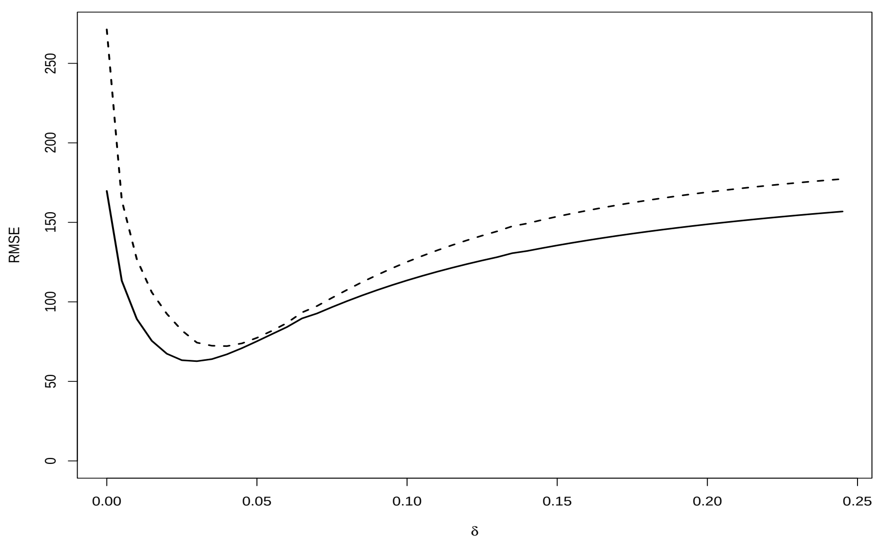

Figure B.192: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = -.9$.

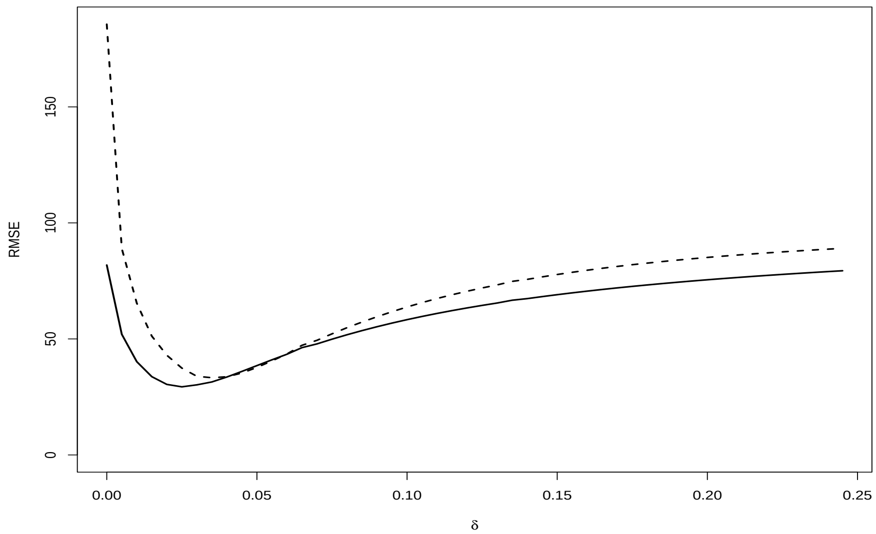

Figure B.193: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = -.5$.

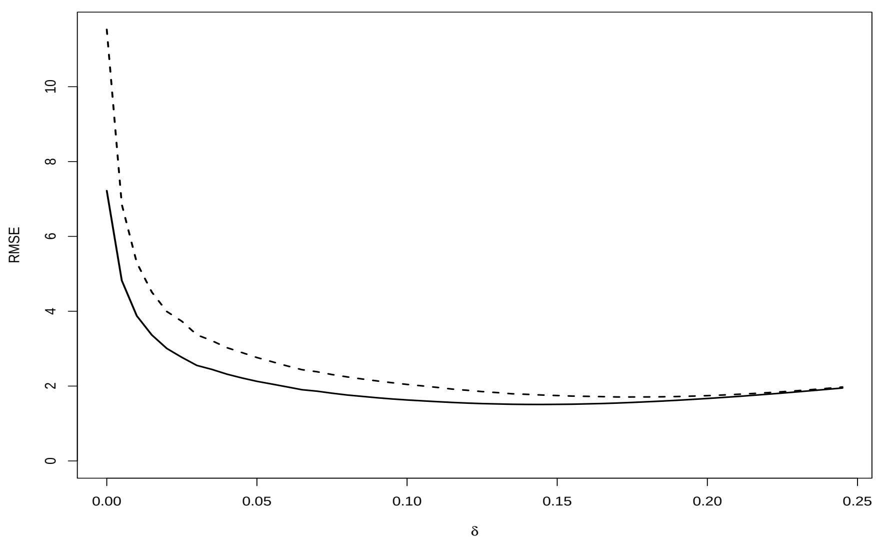

Figure B.194: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = -.5$.

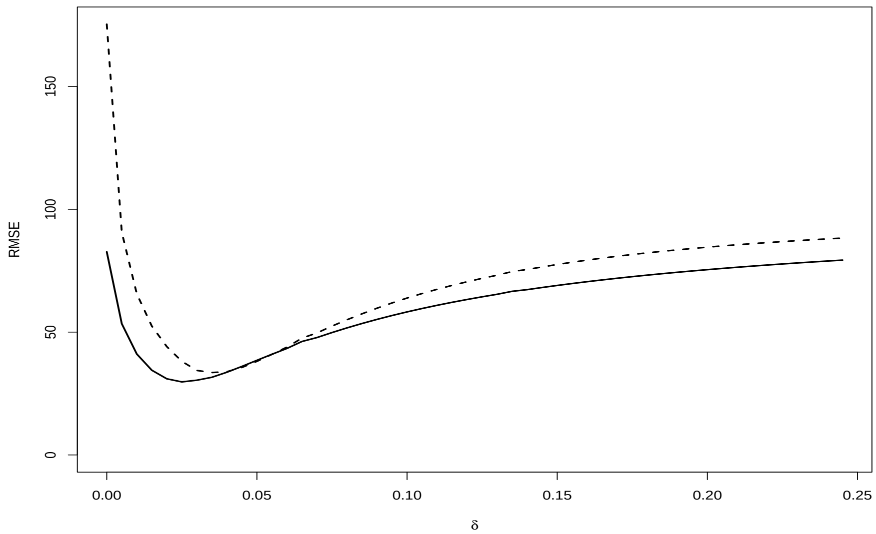

Figure B.195: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = 0$.

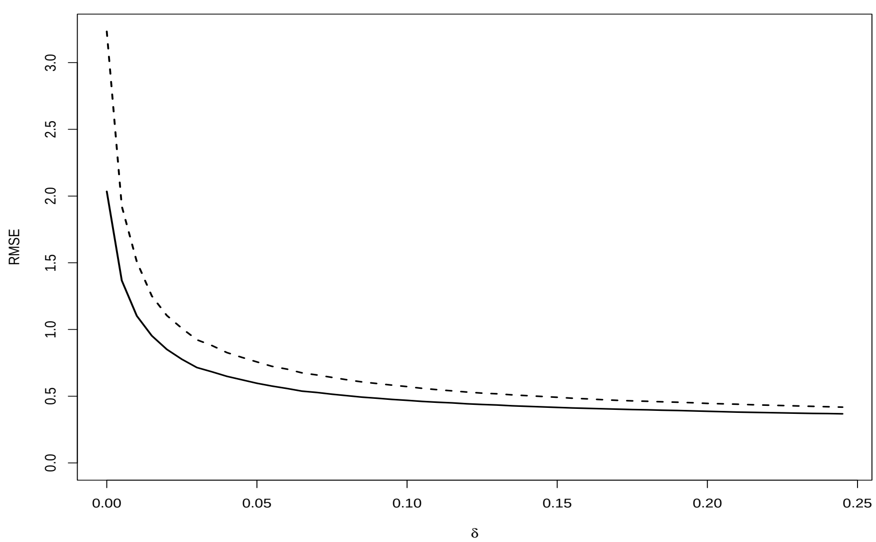

Figure B.196: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = 0$.

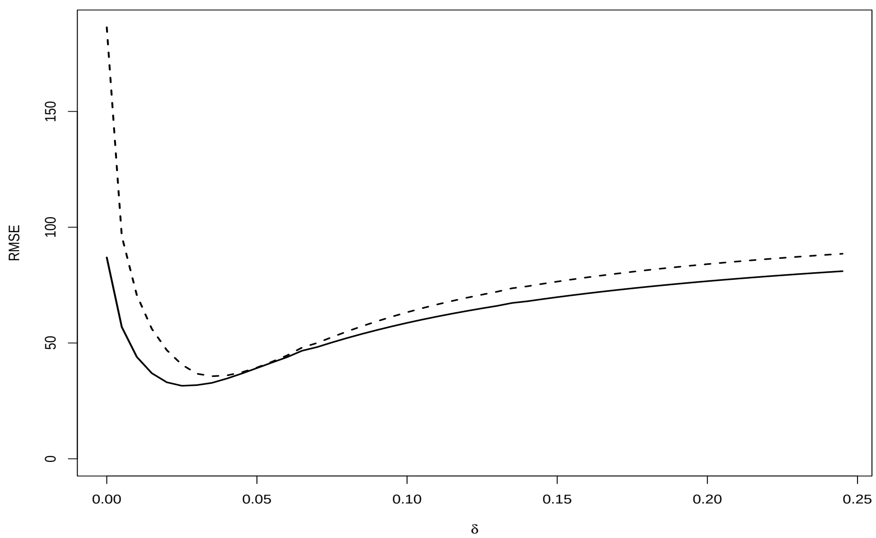

Figure B.197: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = .5$.

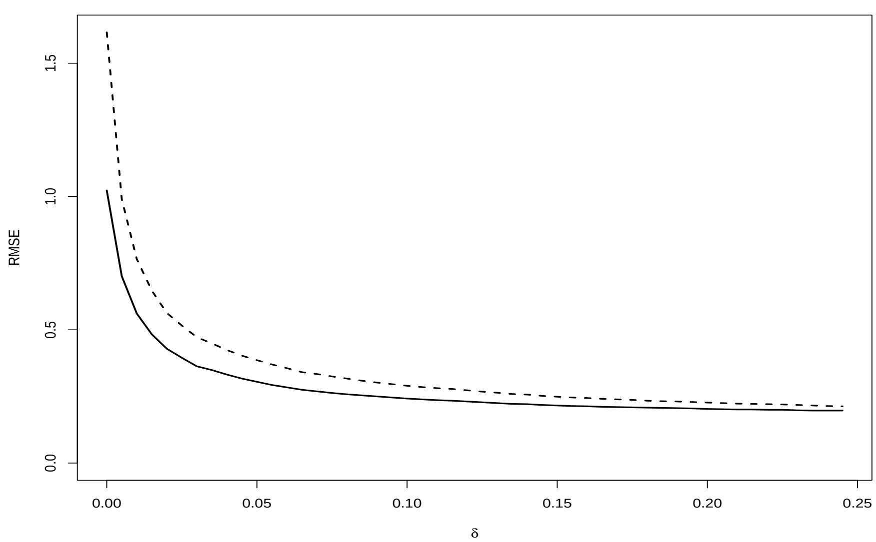

Figure B.198: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = .5$.

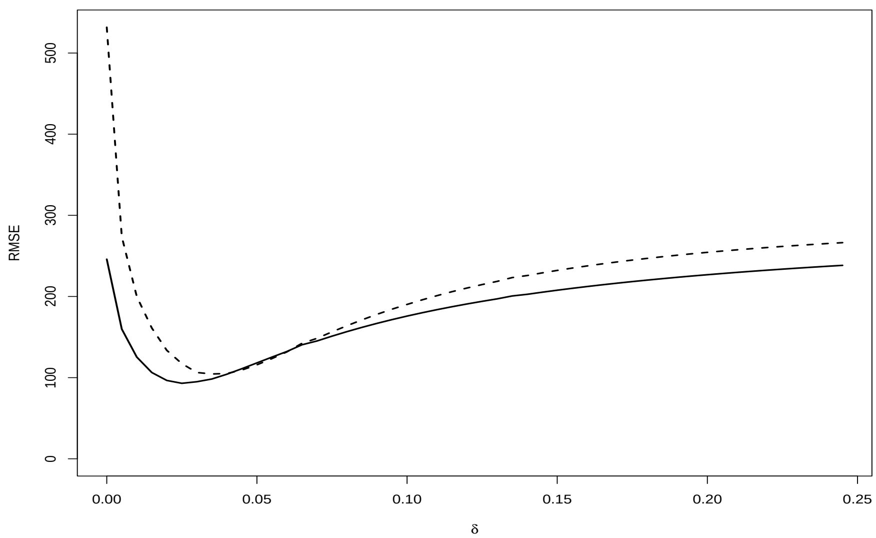

Figure B.199: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency 0 plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = .9$.

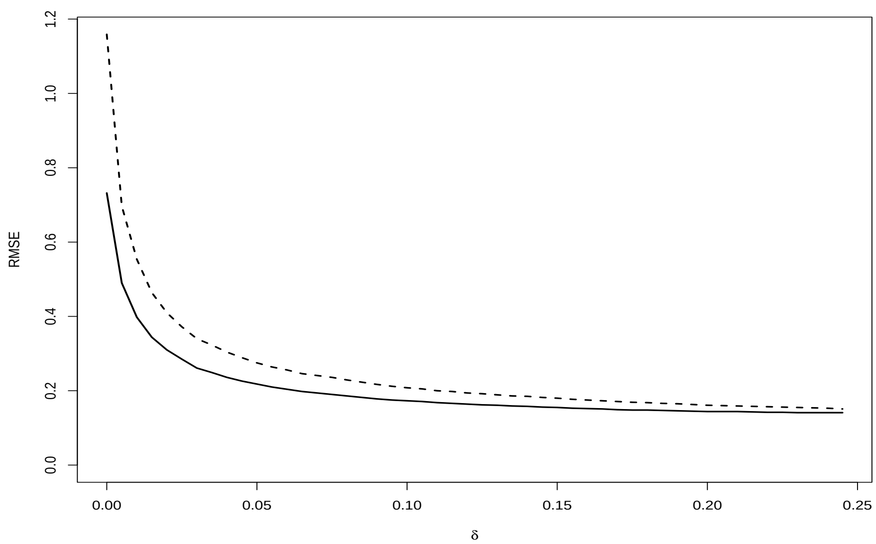

Figure B.200: RMSE of Local Quadratic spectral estimation (solid) and Local Log Periodogram estimation (dashed) at frequency π plotted as a function of δ, based on a sample of size $n = 800$ of a Polynomial Gaussian process with $\phi_1 = .9$ and $\phi_2 = .9$.